Resource

April 2006

Engineering & Technology for a Sustainable World

Watching Like a Hawk

Healing in a Fire’s Aftermath

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FEATURES

7 Watching Like a Hawk
A multidisciplinary undertaking involves setting GPS-sights on developing an integrated system for monitoring livestock behavior. Unlike conventional GPS collars – which are limited in sampling interval and storage and require expensive software to process the data – or costly commercial collars, researchers are aiming lower: less sampling interval for less money.

9 Healing in a Fire’s Aftermath
Limiting damage to fire-scorched areas can be a challenge, especially stemming erosion by rainfall. While agricultural straw is effective, it is soon “gone with the wind,” decomposes rapidly, and may introduce ecologically-unbalancing weeds. Woodstraw™ – an engineered wood-strand mulch – is just what the doctor ordered to protect parched terrain from further trauma.

11 Living with Water-Runoff Regs
Farmers on the Central Coast area of California are coping with still-new regulations in regard to the monitoring of runoff from fields. Finding common ground through programs and waivers has helped. John Inman brings us up-to-date with possible solutions in reducing sediment runoff and how growers have joined hands to work with the regional water quality board.

13 Examining Geothermal Energy
Continuing the series on energy, Jim Fischer and colleagues examine a few geothermal energy technologies: ground source heat pumps and direct-use systems for heating and cooling power, and the use of geothermal energy to generate electric power. Thermal applications will play a role in the future with agricultural applications from greenhouses to crop drying. In rural areas, ample ground space to install and tax incentives encourage use.

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ON THE COVER
Posing for author Jeremiah D. Davis, bovine subjects eye his camera skeptically. Fitted with GPS HAWKs, the cows carry packs mounted directly above their shoulders, held in place with a girth strap and elastic shoulder bands. Monitoring herd health and increasing the security level of the food production chain, the GPS HAWK holds promise as a management tool.
On being green and green

In response to Allen Zimmerman’s inspired and skillfully worded Last Word (Resource, March 2006), let me assure readers that headquarters is quite green — in the typical “color-pallet” meaning of the word. After a long-needed, fresh coat of paint, the ASABE building interior boasts offices with eye-pleasing shades of green: yellowish-green, khaki-green, beryl-green, leek-green, smaragdine-green, blue-green, ivory-green, and chlorite-green. Twenty-five-year-old, threadbare carpeting was replaced — you guessed it! — a delightfully medium shade of olive-green. The workspace is almost chartreuse with delight!

As for being green, we are a staunchly adamant, green group where recycling is concerned — cans, bottles, newspapers, printer ink cartridges, etc. We are energy-efficient, with controlled cooler temps in the winter (we dress in layers) and warmer temps in the summer (no layers!). Reduction of printed materials is always a goal; use of recycled paper and bio-based ink is commonplace. Fuel-efficiency by carpooling in staff travel plans is always top-of-mind. If we had an ASABE vehicle, be assured it would be not only green but also green. And at least one staff member rides a bicycle to work, when Michigan weather permits. Meetings Director Mike Chesser asks penetrating green questions before booking venues; reduce-reuse-recycle is key for him.

In Kermit-the-Frog style, we acknowledge that being green is easier than being green. We’re reminded by our new-hued surroundings not only “talk the green talk, but walk the green walk.” We are best prodded by those, like Dr. Zimmerman, who encourage us all with great wordsmithing style to keep at it.

Sue Mitrovich
Resource Features Editor

Burgers by the breeze

I saw Dr. Fischer and colleagues’ article on wind power in the March issue of Resource and wanted to take a moment to tell ASABE a little bit about what The Holland, Inc. is doing with wind power. The Holland is the parent company to Burgerville, a fast-casual restaurant chain located in the Pacific Northwest. In August of 2005, The Holland expanded upon its long-standing commitment to sustainable operations by committing to the use of renewable wind power at all of its 39 Burgerville locations and its corporate office to fill 100 percent of its electricity needs. The adoption of wind power for the company’s Burgerville restaurants represents the largest national implementation of renewable wind power within a quick service restaurant chain.

By utilizing wind power, The Holland and its restaurants will avoid adding 17.4 million pounds of CO2 to the region annually. Eliminating this volume of the harmful greenhouse gas is the equivalent of taking approximately 1,700 cars off the road or reducing the number of miles driven in the region by 19 million.

If any ASABE members would like additional information on how The Holland is using wind power, please feel free to contact us.

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Resource
Engineering & Technology for a Sustainable World

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Reducing dairy odor emissions

Simple modifications of current management practices can lead to dramatic improvements in odor emissions from dairy farms, says a South Dakota State University (SDSU) specialist.

“Dietary modifications that result in reduced ammonia emissions should be considered best management practices,” says SDSU Extension Dairy Specialist Alvaro Garcia. “Those practices include adequately balancing diets, feeding highly digestible feedstuffs, and preserving feeds adequately.”

Garcia notes that a recent study conducted by the Wageningen research center in the Netherlands studied the effect of diet on ammonia emissions from dairy cow barns. This trial also evaluated the usefulness of testing for milk urea as an indicator of emission reduction.

During this experiment, Holstein cows were housed in confinement and were fed a diet that consisted of ensiled forages and concentrates. Cows were offered rations that contained rumen-degradable protein.

Ammonia emissions from the barn increased with higher levels of rumen-degradable protein balance in the diet. Bulk tank milk urea and temperature were highly correlated with ammonia emissions from the barn, accounting for 76 percent of the variation in emission. Temperature appears to have a positive correlation with ammonia emission. Ammonia emission from the barn increased 2.7 percent when outdoor temperatures increased by 1.8°F.

The study concluded that the emission of ammonia from naturally ventilated dairy cow barns was strongly influenced by diet. The emission can be reduced approximately 50 percent by reducing the rumen-degradable protein balance of the ration.

Testing for milk urea nitrogen can be a useful and inexpensive tool to monitor when rumen degradable protein is fed in excess of requirements so that the likelihood of ammonia emissions increases.

For more information on odor control practices and their effectiveness, visit http://agbiopubs.sdstate.edu/articles/ESS803-D.pdf or contact Garcia, 605-688-5488.

Growing better nursery plants

A new monitoring system is teaching researchers and nursery growers how to grow better trees and horticultural plants using more precise, efficient, and safe applications of water, nutrients, and pesticides.

The system is the brainchild of a team assembled over the past three years by Charles Krause, research leader and plant pathologist in the Agricultural Research Service Application Technology Research Unit at Wooster, Ohio.

Although the lessons learned in the research are still experimental, they are already being adopted so rapidly by nursery operators that some in the industry expect the monitoring system to be commercialized within the next few years. Nursery managers have reduced water use by 40 percent or more by applying these lessons.

The system monitors plant needs year-round, currently using 30 sensors for each of three sets of 50 trees. Tests are being done at Willoway Nurseries in Avon, Ohio, on red sunset maple, redbud, and Chanticleer pear trees. The sensors and a weather station linked to computer data loggers take readings – every minute, 24 hours a day, during the growing season – of measurements such as soil temperature and moisture.

The tests are being done with an increasingly popular production technique called “pot-in-pot,” in which potted plants are set inside holder pots permanently buried in the field. This lends itself to the new monitoring system, but it is not the only technique that would work with it.

Excess water draining from the pots is measured and evaluated for quality and levels of wasted nutrients and pesticides. The system has shown that applying water at a slower rate several times a day reduces total water use and has revealed that the trees were being over-fertilized. It also promises to be the safest way to target pesticides, pumping them through hoses to individual spray nozzles attached to stakes in each plant pot.

For more information, contact Krause, krause.2@osu.edu.
Purdue exhibit explains nanotechnology

Something really small has gotten really big in science, and Purdue University is working to help people understand it.

Nanotechnology uses particles as small as atoms and molecules to create new materials, structures, devices, and systems. "Nano In Your Neighborhood" is an interactive exhibit created at Purdue that relates this emerging science to everyday life.

"By walking through the "nanotown" we’ve created for this exhibit, you can really get a feel for how nanotechnology can, and already does, improve products and help the environment," says Jon Bricker, who coordinates the Department of Agricultural Communication exhibit design center which created the exhibit.

It includes interactive elements like "Shine a Light on Cancer," which uses black lights and special paint to emulate how nanotechnology can help detect cancer cells.

Not only does the exhibit introduce nanotechnology, but it also shows how it’s already used in videos that bring to life what you can’t see with the naked eye.

Video animations throughout the display fly you into a human eye to see how a new glaucoma sensor works, stop a tennis ball in mid-flight to show how it’s built with nanotechnology, and even visualize an elevator to outer space made from nanotubes.

Even though nanotechnology researchers work with particles small in stature, their discoveries have big applications in products as wide ranging as crop production and combat gear.

Purdue scientists have used nanotechnology to create sensors for food-borne pathogens. Someday those sensors could be used on a larger scale to alert people of food bioterrorism, animal diseases, or crop threats.

“Nano In Your Neighborhood” will be open at the Indiana State Museum, Indianapolis, until July 23.

Visit www.in.gov/ism/ for more information about the museum and the exhibit.

Amazon’s black soil could change poor soil into fertile ground

The search for El Dorado in the Amazonian rainforest might not have yielded pots of gold, but it has led to unearthing a different type of gold mine: some of the globe’s richest soil that can transform poor soil into highly fertile ground.

Scientists have a method to reproduce this soil – known as terra preta, or Amazonian dark earths – and say it can pull substantial amounts of carbon out of the increasing levels of carbon dioxide in the Earth’s atmosphere, helping to prevent global warming. That’s because terra preta is loaded with so-called biochar – similar to charcoal.

Johannes Lehmann, assistant professor of biogeochemistry in the Department of Crop and Soil Sciences at Cornell University, says the super-fertile soil was produced thousands of years ago by indigenous populations using slash-and-char methods instead of slash-and-burn. Slash-and-char uses low-intensity smoldering fires to clear land for agriculture. Even though the fires are low-intensity, they create charcoal in the soil that can store carbon for centuries.

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Wireless “wear and tear” sensor to predict mechanical breakdowns

Sensors which are able to predict when mechanical parts in machinery and transport will break down before they actually do could be introduced by 2010, slashing maintenance costs across the manufacturing, automotive, and plant machinery industries.

Scientists at The University of Manchester are developing a new type of wireless sensor which will be able to remotely monitor mechanical parts and systems. The aim is to produce a sensor which can be seamlessly fitted inside gearboxes, motors, diesel engines, wheel bearings, and door mechanisms in which faults can occur.

Once fitted, the sensors would enable the “health” of the parts to be remotely monitored by computers which would then use the data to predict when parts require maintenance or need replacing – before they fail.

“This technology will dramatically reduce the delay and cost caused by impromptu breakdowns,” says Andrew Starr, who will lead the Manchester side of the Europe-wide project. “In theory, we could get breakdowns down to zero with this technology.”

Manchester will develop a multi-measure and MEMS sensor which will measure a range of selected parameters (e.g. vibration, temperature, pressure) for condition monitoring applications. Another application will be inside lubricated machinery. In this instance, sensors would measure concentrations of metallic elements created through “wear and tear” from which the lifespan of the part could be calculated.

The sensor will be developed as part of an initiative funded by the European Union under Framework 6, known as DYNAMITE (Dynamic Decisions in Maintenance). The project will focus on applications in plant machinery, manufacturing, and transport.

For more information, contact Simon Hunter, simon.hunter@manchester.ac.uk.
fires covered with dirt and straw, for example, which partially exclude oxygen.

Slash-and-char actually reduces greenhouse gases, Lehmann says, by sequestering huge amounts of carbon for thousands of years and substantially reducing methane and nitrous oxide emissions from soils.

“The result is that about 50 percent of the biomass carbon is retained,” Lehmann says. “By sequestering huge amounts of carbon, this technique constitutes a much longer and significant sink for atmospheric carbon dioxide than most other sequestration options, making it a powerful tool for long-term mitigation of climate change. In fact we have calculated that up to 12 percent of the carbon emissions produced by human activity could be offset annually if slash-and-burn were replaced by slash-and-char.”

In addition, many biofuel production methods, such as generating bioenergy from agricultural, fish and forestry waste, produce bio-char as a byproduct. “The global importance of a bio-char sequestration as a byproduct of the conversion of biomass to bio-fuels is difficult to predict but is potentially very large,” he adds.

Applying the knowledge of terra preta to contemporary soil management also can reduce environmental pollution by decreasing the amount of fertilizer needed, because the bio-char helps retain nitrogen in the soil as well as higher levels of plant-available phosphorus, calcium, sulfur, and organic matter. The black soil also does not get depleted, as do other soils, after repeated use.

“In other words, producing and applying bio-char to soil would not only dramatically improve soil and increase crop production, but also could provide a novel approach to establishing a significant, long-term sink for atmospheric carbon dioxide emissions from soils.”

**Waste management system solves several major problems**

University of Florida (UF) researchers have developed a manure management system that produces energy, saves valuable nutrients for fertilizer, cuts greenhouse gas emissions, and stops offensive odors.

“Our innovative animal manure management system is a sustainable option for dairies and other livestock operations that produces renewable energy and protects the environment,” says ASABE member Ann Wilkie, an associate research professor with UF’s Institute of Food and Agricultural Sciences.

Wilkie says the growing number of big dairy and swine livestock farms – along with urban sprawl in rural areas – has resulted in greater awareness and concern about the proper storage, treatment, and utilization of manure.

“The key to our waste management system is a natural biological process called anaerobic digestion that relies on microorganisms to transform animal manure into methane gas,” Wilkie says. “Anaerobic digesters, which process waste under oxygen-free conditions, are different than conventional aerobic systems that use oxygen to treat the waste.”

Anaerobic digesters can process five to 10 times more waste than aerobic systems, says Wilkie. Because the waste is enclosed to keep oxygen out, anaerobic digestion keeps odors in. Odors, flies, and pathogens are reduced by as much as 95 percent.

With anaerobic digestion, the methane produced can be used to heat water or generate electricity, eliminating greenhouse gas emissions. Nutrients such as nitrogen and phosphorus can be recovered and used to fertilize crops.

To demonstrate the technology at a working dairy farm, a large-scale anaerobic digester at UF’s 500-cow Dairy Research Unit in Hague, Fla., is now generating biogas from manure flushed from animal barns and milking parlors.

Because manure flushed from these areas is so diluted by water, only two types of anaerobic digesters are practical for Florida dairies – covered lagoons and fixed-film digesters, Wilkie says. Covered lagoons require large land areas, gas-tight covers, and careful sealing to prevent nutrients from leaching into groundwater. By contrast, the fixed-film anaerobic digester at Hague is a 100,000-gallon tank that can be a real plus when local land-planning issues are a concern, she adds.

A fixed-film digester can process flushed manure in two to three days compared to 30 to 40 days for a covered lagoon, says Wilkie. Generally, the fixed-film design is suitable for any livestock manure that is diluted with water for transport or processing, such as dairy and swine waste.

For more information, contact Wilkie, 352-392-8699, acwilkie@ifas.ufl.edu.
dioxide,” says Lehmann. He noted that what is being learned from terra preta also can help farmers prevent agricultural runoff, promote sustained fertility, and reduce input costs.

For more information, contact Blaine Friedlander, bpf2@cornell.edu.

**Agriculture provides many environmental benefits**

When people hear the word agriculture, most think of food. But the benefits of agriculture are much more than farm fresh corn or dairy products. Now scientists are investigating how farmers can manage their land to offer everyone more environmental benefits and whether farmers could be paid for providing these benefits.

“**Agriculture, which includes planted forests, is the world’s largest human-managed ecosystem,”** says Scott Swinton, professor of agricultural economics at Michigan State University. “There is a huge area of land that people manage for food, fiber, and fuel – all marketed products with a value attached to them. What we want to know is if we can also manage agriculture for things that people like and appreciate, but don’t have markets, such as cleaner air, cleaner water, less global warming, wildlife habitat, and aesthetics. People enjoy seeing the green, open space of farmland in their communities.

Swinton, who studies sustainable agriculture, thinks the idea of ecosystem services is timely. As international trade becomes increasingly more open, many of the protections given to agricultural products are being reduced. By looking at the entire gamut of products that agriculture provides, decision-makers can make more informed choices about whether, how, and why farming can be supported. The principles behind the ecosystem services idea could allow farmers to be supported if they successfully improve the environment and strengthen nature’s benefits to society.

“For many years, the focus of sustainable agriculture has been on avoiding negatives: water pollution, soil erosion, pesticide residues, etc. In the ecosystem services concept, we’re focusing on services that people appreciate and enjoy. Since the amount of land involved in agriculture is so large, we have a strong motivation to provide farmers incentives to support the ecosystem,” says Swinton.

The Millennium Ecosystem Assessment, launched in 2001 by the United Nations, defines four broad categories of ecosystem services.

**Provisioning services** are the products from ecosystems, including genetic resources, food and fiber, and fresh water.

**Regulating services** are the benefits people get from the regulation of ecosystem processes, including water supplies, temperature moderation, and some human disease regulation.

**Cultural services** are the non-material benefits people receive from ecosystems through spiritual enrichment, cognitive development, reflection, recreation and aesthetic experiences.

Supporting services are ecosystem services that are necessary for all other ecosystem services. Some examples are production of plant materials and microbes that enrich the soil and allows crops and other plants to grow; oxygen production, which makes it possible for humans and animals to breathe; and water cycling, which nourishes plants and animals and refills lakes, and streams.

“We know that low-input, sustainable agriculture produces improved water and soil quality, contributes to climate stability and boosts beneficial insect populations,” Swinton says. “Now we want to figure out which policies would encourage farmers to provide these ecosystem services, as well as how much citizens are willing to pay for the services.”

For more information, contact Swinton, 517-353-7218, swintons@msu.edu.

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**Combine Combat online game**

Looking for a little friendly combine competition? John Deere is sponsoring a fun Agriculture Online® game that lets players navigate a combine by harvesting a field. By using the keyboard’s arrow keys, players can quickly outpace the Rowdy Rival and avoid a harvest penalty. In addition, players can collect John Deere icons and featured items for speed boosts and added bonuses.

Each game tallies the number of acres harvested, the harvest yield, and the time it takes to complete the harvest. For added excitement, players can add sound and hear cows moaning and roosters crowing. Personal high score can be posted and compared with the high scores of fellow players. See if you can break the $600,000 barrier!

Visit www.agriculture.com/combinecombat to start your own personal harvesting adventure!
Precision agriculture has become more than traditional variable-rate seed and fertilizer, crop-yield maps, and light bars. As technologies become more robust, compact, and economical, more opportunities become available to quantitatively monitor interactions between animal species, forage type, grazing system, landscape, and environmental parameters.

For years, scientists have been working to quantify wildlife and domestic animal behavior and movement within their natural or prescribed environments. Initial studies relied on human observers to monitor specific animals identified by visible markers such as tags, colored collars, or paint. However, use of human observers is labor-intensive and prone to error from observer fatigue. Limitations also arise from length of daylight and weather conditions as well as size of the observable study area and difficulty of defining meaningful behaviors to measure.

**Tracking changes, cutting costs with GPS accuracy**

Researchers began remotely tracking wildlife more than 30 years ago using radio telemetry and triangulation. Initially, the large distance errors associated with the telemetry systems were acceptable because animals such as moose or wolves travel large distances over an expansive territory. The advent of tracking via global positioning system (GPS) and the recent use of differential GPS (DGPS) enabled researchers much-improved accuracy – less than 3 m (10 ft) with some devices – and reliability. These new capabilities offer objective measurements for studying how spatial and temporal distribution of livestock arise due to factors such as forage type, grazing system, landscape, hide color, health status, ambient conditions, and aspect location (water tank, shade, stream, etc.).

As part of a multidisciplinary effort at Iowa State University, the Agricultural and Biosystems Engineering Department is working with the Department of Animal Science and the Iowa Beef Center to develop a new, integrated system for monitoring livestock behavior. Most conventional GPS collars are limited in the minimum sampling interval and maximum data storage capacity and require expensive proprietary software packages to retrieve and process data. Many of the commercial collars carry a relatively large price tag. To this end, researchers are only able to monitor a small number of animals as a subset of the herd for given activities or treatments. The data are then extrapolated across the total number of animals in each treatment to determine herd behavior. This method relies on the assumption that all animals in the herd traversed the study area in a well-defined grouping. Part of the research will attempt to define optimal sampling methods that provide data to accurately reflect whole-herd movement and behavior.

**A steer, snugly fitted with the initial GPS HAWK configuration models his gear for a snapshot by the author.**

**During extreme July temperatures, cattle lounged under large shade trees, an activity which negatively affected the GPS-location-data accuracy.**

Jeremiah D. Davis

**Watching Like a Hawk**

GPS Herd Activity and Welfare Kit developed
First things first, one thing at a time

The first task was to develop a low-cost GPS Herd Activity and Welfare Kit (GPS HAWK). Operational goals for the GPS HAWK are similar to commercial collars, i.e., to collect GPS positions at a user-specified sampling frequency and store it in a secure format. However, researchers wanted to decrease the minimum sampling interval from the typical 5-min period to a 30-s period and store the data in text file format requiring no additional software to download or manipulate.

Sampling interval and quality of the position fix in a portable GPS tracking unit are a function of operating time and the major driving force of power management. The higher quality position fix and the smaller the sampling interval require larger amounts of energy over a given period. To retain a relatively small mass, commercial collars are limited on battery capacity and, in turn, on the number of locations and peripheral data if any. A shoulder mounted harness, rather than the traditional collar, was designed in order to support a larger capacity, sealed-lead acid battery as well as increase the GPS HAWK visibility to the horizon.

The system should also use a low-power, compact GPS engine that offers the best accuracy possible. Rather than building a board-level GPS engine and antenna, the design utilized a Garmin 12-channel GPS engine. The self-contained unit uses the Wide-Area Augmentation System to deferentially correct the GPS signal on board with horizontal errors less than 3 m (10 ft). No timely manual post-processing of data is needed.

In addition, the research team wanted the capability to monitor several analog sensor devices as needed. Along with the GPS temporal and spatial data, researchers are working to develop methods to remotely monitor parameters such as environmental conditions, animal temperature, the occurrence and effectiveness of bunching, and water consumption. Several researchers have recently conducted studies to determine sediment and nutrient loading from cattle grazing riparian zones. The scientists were able to determine the amount of time spent within a certain buffer zone around the streams but were unable to discern what the animals were doing (drinking, loafing, or other). These peripheral sensors will allow us to quantitatively monitor bunching activity and drinking events and determine the effects, if any, the cattle have within a riparian buffer zone.

The final design criterion was to create an economical system so a larger number of sample animals within a herd could be monitored simultaneously. To truly understand the dynamics of herd behavior using GPS systems one must first use the smallest sampling interval achievable (30 s) and monitor the entire herd of a treatment group. The research team was able to construct 20 GPS HAWK units for approximately the cost of purchasing two or three commercial GPS collars. At the present, researchers are working to develop sampling methodologies to determine the minimum number of animals needed to represent whole-herd behavior as well as the minimum sampling interval to distinguish between certain activities.

Looking down the path

Ultimately, the GPS HAWK unit could lead to a management tool for cattle producers to continuously monitor herd health, thereby increasing the security level of our food production chain.

ASABE member Jeremiah D. Davis is a graduate student at Iowa State University, 3980 S. 500th Ave., Ames, IA 50014 USA; 515-294-5749, davisj@iastate.edu.
According to the National Interagency Fire Center, each year for the last six years, an average of 78,000 wildfires have burned 1.7 million ha (4.3 million acres) in the United States. The human response to those fires varies greatly: some are left to burn themselves out, while others are suppressed with every resource available. Generally, those fires that require a large suppression effort also require follow-up assessments and management to limit further damage to the burned area.

How can a burned area be further damaged?

In the aftermath of a fire, areas formerly covered by vegetation can be highly susceptible to soil erosion during rainstorms. Another problem is rapid water runoff, which can lead to flooding in nearby streams. In fact, in some slow-moving, intense fires, burning vegetation creates a gas that penetrates the soil. As those gases cool they condense and form a waxy coating, which causes the soil to repel water—a phenomenon called hydrophobicity. In such cases, the rate of water runoff increases dramatically. Yet another post-fire problem is soil erosion that can lead to heavy sediment loads clogging nearby streams and reservoirs. Finally, the loss of topsoil and unburned organics left on the site can reduce soil productivity and delay the recovery of vegetation. Fortunately, soil scientists and hydrologists have developed an array of tools to manage areas susceptible to post-fire damage. For example, water runoff can be slowed by felling logs across slopes, straw bale check dams can be built in drainages, and water bars can be built across roads. While all of the above are good techniques to reduce down-slope effects, they do little to protect a burned area’s soil from erosion.

Stopping erosion in its tracks

One of the most common soil erosion control measures is spreading agricultural straw mulch across an erodable area. The mulch intercepts rainfall, thereby reducing the impact of raindrops hitting and displacing bare soil. In addition, mulch slows water runoff, thereby decreasing the chance for erosion. While agricultural straw is effective in controlling erosion it has some drawbacks: it can be blown off the site by wind, it decomposes quickly, and it may introduce noxious weeds into ecologically sensitive areas.

The birth of WoodStraw™

After recognizing the problems associated with agricultural straw, researchers at Forest Concepts, LLC, Federal Way, Wash., began development of an alternate erosion control product. They spent two years “figuring out the science behind why agricultural straw does what it does” and then created a substitute made from wood-based materials. WoodStraw™, the research result, is an engineered wood-strand mulch—an mix of long and short wood strands that are spread over an erodable area to control soil erosion. Both the long and short strands are 4.7 mm wide by 2.5 mm (0.2 by 0.1 in.) thick, but the long strands are 160 mm (6.3 in.) long whereas the short strands are 64 mm (2.5 in.) long. Identifying the optimum strand size and best blend between long and short was a cooperative effort between...
Forest Concepts and the USFS Rocky Mountain Research Station in Moscow, Idaho, that included more than 200 experimental runs on laboratory rainfall simulators. ASABE members Bill Elliot, Randy Foltz, Pete Robichaud, Jim Fridley, and Joan Wu were valuable cooperators in the development of the woodstraw mulch.

**Water-repellent when tested**

After the initial laboratory research efforts, field trials were carried out to compare the erosion control effectiveness of WoodStraw™ and agricultural straw. Controlled studies were conducted in western Washington and central California on highly erodible loam soils. On slopes ranging between 15 and 25 percent, several 5-×-30-m (16-×-98-ft) plots were established. Some of the plots were covered with WoodStraw™ mulch, others were covered with agricultural straw, and others were left bare to serve as controls. The amount of erosion that occurred on each plot was then monitored for several months. The results indicated that the WoodStraw™ engineered wood-strand mulch and the agricultural mulch were equally effective in controlling erosion. However, after about three months, much of the agricultural straw mulch had decomposed, and thus its effectiveness in controlling erosion was reduced. The Woodstraw™ engineered wood-strand mulch was still intact.

Another study is currently underway at the University of Washington Research Forest to monitor the long-term performance of WoodStraw™ mulch relative to agricultural straw.

**Dollars and sense**

While WoodStraw™ mulch costs somewhat more than agricultural straw, it lasts longer, is inherently free of noxious weeds, is more ecologically compatible with forest soils, and is less likely to blow away in the wind.

The product is made in a process similar to paper passing through a shredder. Forest Concepts engineers developed a machine that "eats" sheets of wood veneer and spits out Woodstraw™ strands on the other end. Processed wood strands are baled into 23-kg (50-lb) and 270-kg (600-lb) bales that are easily shipped and can be handled and spread on a site like agricultural straw.

The first commercial sales in early 2005 were to Weyerhaeuser Company, Washington State's King County, and the USDA Forest Service. Production from a pilot plant resulted in sales of more than 82 Mg (90 tons) of WoodStraw™ erosion-control mulch, including use on the School Fire in eastern Washington and the Snake 1 Fire in Idaho. The market continues to develop.

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WoodStraw™ engineered wood-strand mulch products will be featured in an exhibit at the ASABE Annual International Meeting this summer in Portland, Ore. For more information about WoodStraw™ contact ASABE member Jim Dooley, Forest Concepts, LLC, 1020 S 344th St. Ste. 211, Federal Way, WA 98003 USA; 253-838-4759, dooley@seanet.com or Rich Lane, Natural Resource Solutions, 406-370-4767.
Growers in the Central Coast area of California are facing new regulations on monitoring water runoff from their fields. The regulations imposed by the Regional Water Quality Control Board, which is part of the California Environmental Protection Agency, require monitoring of runoff water from irrigated fields for a number of contaminants including sediment and nutrients, i.e., fertilizer materials.

The regulations are California’s approach to implementing water quality standards established by the Clean Water Act. The Federal regulations refer to total maximum daily load for sediments, nutrients, and other water contaminants. As the monitoring programs instituted Jan. 1, 2005, are now underway, there will be limits, and growers will have to reduce contaminants in their runoff water.

Needless to say, such a monitoring program could prove to be a very burdensome task and quite expensive for individual growers. Working through local agricultural organizations, including the Monterey, Santa Cruz, and San Mateo County Farm Bureaus, several things were agreed to that at least made the regulations bearable.

Finding common, runoff-reduced ground

First, growers could enroll in a cooperative monitoring program where monitoring is done on rivers and their tributaries in agricultural areas of the region instead of monitoring each individual grower’s farming operation. Secondly, growers could receive a conditional waiver for five years if they complied with certain requirements.

These requirements include the grower taking 15 hours of Regional Board-approved farm-water-quality education, completing a farm plan listing practices that would be used to reduce runoff, and providing a biennial practice checklist showing how the farm plan is being implemented. The last requirement is that the grower must do individual water quality monitoring or participate in a cooperative monitoring plan as described above.

The practices that a grower could use to reduce runoff could include winter cover crops, which reduce runoff in comparison to bare fields; ponds to contain tail water rather than allowing it to leave the farm; and drip irrigation, which usually reduces or eliminates runoff and...
Nutrients in runoff water can be reduced by changing fertilizer practices or reducing application rates.

Research is underway on other practices that could reduce runoff and contaminants in it. For example, at a recent meeting held by the University of California Cooperative Extension Service in Salinas, practices were discussed that could reduce problems in runoff water.

A major problem is soil sediment in runoff. As mentioned earlier, cover crops can reduce soil sediment in runoff. Another approach to reduce sediment is the use of polyacrylamide (PAM). This material has been used for years to stabilize soil and prevent erosion in nonagricultural applications. Research by Michael Cahn and other Monterey County Farm Advisors has shown that 0.22 to 0.34 kg (0.5 to 0.75 lb) of PAM per acre in sprinkler irrigation water can reduce sediment by up to 95 percent. Cost is in the range of $6 per acre, and the Natural Resource Conservation Service will cost share at $3 per acre.

Farm advisor Richard Smith’s research showed that in 2002-2003 only one out of 12 sites in the Salinas Valley responded to phosphate fertilization indicating that there was sufficient phosphorus already in the soils in many fields, and phosphorus can be a major problem in runoff water. Furthermore, there is a relatively simple and accurate test for evaluating phosphorus supply in the soil and determining if phosphate fertilization is required.

The meeting moved to the field where there were cover crop demonstrations and a demonstration using PAM in sprinkler irrigation water. There is little doubt that it is going to take considerable work and expense to comply with these new regulations. Fortunately, the grower groups in the area have joined hands and continue to work closely with the Regional Water Quality Control Board to come up with reasonable solutions such as the cooperative monitoring program.

For growers in the rest of the country, programs like this will be coming to their areas. They should be prepared to work with the regulators so the program will be workable for them.

**Water-quality monitoring by fee**

Central Coast Water Quality Preservation Inc. (CCWQP), a non-profit entity, was established to do the required water-quality monitoring under the Cooperative Monitoring Program as of January 2006. It is governed by a board of directors from the agricultural industry, representing all of the counties covered by the Central Coast Regional Water Quality Control Board. CCWQP is financed by fees based on farm size and irrigated acres. The fee schedule has three components including a monitoring fee, an administrative fee, and a fee for the State Water Quality Control Board. In 2005, monitoring costs were covered with grant funds.

With CCWQP, agriculture in the area under the jurisdiction of the Central Coast Regional Water Quality Board was able to implement the required monitoring program without getting a governmental agency involved.

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Geothermal energy is used in three separate types of applications that utilize very different technologies. Two of these applications—heat pumps and direct use—are thermal applications, while the third type is used for generating electrical power.

**Heat pumps**

Geothermal heat pumps can be used throughout the nation for heating and cooling buildings. Geothermal heat pumps take advantage of soil and near-surface rocks, from 1.5 to 15 m (5 to 50 ft) deep, which have a nearly constant temperature and provide a heat source in the winter and a heat sink in the summer. Fluid is circulated through a loop of piping that is run underground to create a heat exchanger. An indoor system extracts the energy from the fluid for heating or adds energy to the fluid for cooling—replacing both a furnace and an air conditioner.

Geothermal heat pumps are more expensive to install than conventional heating and cooling systems, but because monthly energy bills are lower, they are less costly in the long run—often paying for themselves with energy savings within five years. The United States Energy Policy Act of 2005 provides up to $300 in tax credits for homeowners for certain heat pump systems. Also, 22 states offer tax incentives for geothermal heat pumps. The estimated 600,000 to 800,000 geothermal ground-source heat pumps now in use in the United States account for more than 90 percent of thermal applications.

**Direct use**

Systems that use geothermal heat directly, without conversion to electricity, are operating throughout the western United States and in a few locations in the East. Direct-use projects tend to be developed on an ad hoc basis as a domestic industry dedicated to direct heat has not evolved. The direct-use installed capacity in the United States is 617 MWt in applications such as space heating, aquaculture, and industrial processing. There are 20 district heating systems in the United States using geothermal energy and dozens of others around the world. A district heating system in Boise, Idaho supplies more than 400 homes and a number of public and commercial buildings including the state capitol complex. In Iceland, geothermal energy is used to heat 85 percent of the country’s houses.
Many agricultural applications can use geothermal heat. Geothermal fluids are used for such purposes as heating greenhouses, dehydrating vegetables, heating water for fish farming, and pasteurizing milk. Vegetables, flowers, ornamentals, and tree seedlings are grown in 43 greenhouse operations heated by geothermal energy in nine states. Forty-nine geothermal aquaculture operations in 11 states raise catfish, shrimp, alligators, tropical fish, and other aquatic species. Agri-industrial applications include food dehydration, grain drying, and mushroom culture. Drying onions and garlic is the largest industrial use of geothermal energy.

The low-to-medium temperature – 88-149°C (190-300°F) – geothermal resource base is much more plentiful and widespread than the high-temperature – more than 149°C (300°F) – resource base, which is needed to generate electricity. Low and medium temperature geothermal resources are underutilized for thermal applications and can be found in a number of important farming states playing a role in every farm chore in which heat or warm/hot water is required.

The Geo-Heat Center in Oregon has identified more than 9,000 thermal wells and springs, more than 900 low-to-moderate temperature geothermal resource areas, and hundreds of direct-use application sites in 16 western states. In these states, there are 404 potential geothermal sites within five miles of communities that serve 9.2 million people.

Geothermal power

Geothermal energy can be converted to electricity. In 1960, the country’s first large-scale geothermal electricity-generating plant began operation at The Geysers in California. Today, 69 generating facilities are in operation at 18 resource sites around the country. Geothermal power plants typically produce energy for 5 to 8 cents/kWh.

In the United States, high-quality geothermal resources are found predominantly in the west. Geothermal generation is currently limited to California (2,239 MW), Nevada (239 MW), Utah (26 MW), and Hawaii (30 MW). Installed nameplate geothermal generating capacity has increased from about 500 MW in the early 1970s to more than 2,500 MW, partly due to federal loan programs that subsidized geo-thermal exploration and development during the 1980s. Domestic geothermal energy production accounts for almost 20 percent of all non-hydropower renewable electricity production and about 0.35 percent of total U.S. electricity production.

After a 12-year period during which no plants were built, 12 geothermal power plants totaling nearly 500 MW are under construction in Alaska, California, Idaho, New Mexico, Nevada, and Utah. A Federal production tax credit extended to geothermal power production by the Energy Policy Act of 2005 (currently set at 1.9 cents/kWh for 10 years and adjusted annually for inflation) is encouraging development.

Arizona and Oregon also have near-term development potential for development. The Western Governors’ Association has identified 5,600 MW of geothermal resources that can be economically developed over the next decade.

Looking ahead

Thermal applications of geothermal energy can play an important role in agricultural applications including greenhouses, aquaculture, and crop drying. In rural areas, ground space to install geothermal heat pump systems should be readily available, and tax incentives may encourage their use.

For further reference, see:

- Geo-Heat Center, http://geoheat.oit.edu/


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Noble Blade Cultivator Dedicated as ASABE Historic Landmark

The Noble Blade Cultivator was dedicated as the 46th ASABE Historical Landmark on Sept. 24, 2005 in Nobleford, Alberta, Canada. The dedication was held in conjunction with the ASABE Pacific Northwest Section’s 60th Annual Regional Conference.

Construction of the Noble Blade began in a blacksmith shop on the Noble farm near Nobleford, Alberta, in 1936. The first patent was applied for in 1937. In 1941, a factory was built in Nobleford, and in 1952 the company moved into a bigger plant.

Charles S. Noble was the inventor, designer, engineer, and constructor of the first blade. Improvements were made with the assistance of his sons and hired help.

During the 1930s, thousands of acres of land were rendered unproductive due to soil drying out and wind erosion of irreplaceable soil. Use of the mold plow was not suitable for use in the prairie regions. There was a need for soil conservation in tillage practices. The solution was to make use of “plowless fallow.” The blade would cut the stubble and weeds off below the ground surface, leaving residue on the soil to reduce evaporation and prevent erosion by strong Alberta winds. The Noble Blade also created a mulch of loose soil that helped conserve soil moisture. The Noble family later developed a variety of straight and V-blade cultivators. By 1979, more than 10,000 Noble cultivators had been built for use in western Canada, the United States, Australia, Russia, and India.

The production of the Noble Blade kept the town of Nobleford alive as most of the population worked at the factory. In the first three years of operation, the 1952 plant produced about a million dollars worth of Noble Blades and soon became one of the largest manufacturing plants of farm equipment in western Canada.

“It is the next generation that pays for the sins of careless and greedy soil management,” said Noble, a forward thinker. “The man who would earn the full respect of his son should make sure the young man inherits the soil as well as the farm.”

The ASABE Historical Agricultural Engineering Landmark activity commemorates significant past accomplishments with appropriate landmarks. For a listing of all ASABE Historical Landmarks, visit www.asabe.org/awards/historic2/index.html.
Worried About Identity Theft? A New Benefit for Members

Fifteen million Americans had their identities stolen last year. Will you be next?

Because ASABE cares about you — and members of your family — we have partnered with LifeLock to protect your personal identity from the fastest growing crime in America.

You can protect yourself, your spouse or partner, and your children with LifeLock, the only identity theft prevention system of its kind. Backed by a $1 million guarantee, LifeLock blocks the avenues thieves typically use to steal personal identities.

What LifeLock Provides

• Identity theft prevention — not after the fact help.
• Locks out personal identity thieves with a reliable, certified process.
• Stops pre-approved credit offers and drastically reduces junk mail.
• Offers free credit reports and a streamlined credit application process.

How ASABE Benefits

When you become a LifeLock member, ASABE benefits, too. ASABE will receive 20 percent of the LifeLock membership fees generated from the partnership the first year. In subsequent years, and for as long as you have LifeLock, ASABE will receive 10 percent of annual membership fees. This is a unique and ideal opportunity to benefit ASABE and to protect yourself and family members.

How to Apply

The application process is simple. The discounted monthly fee for ASABE members is $9 — that is 10 percent off the regular price. You can also protect the personal identity of your children for only $9 per child per year.

What Do You Have to Lose?

Only your identity.

To learn more about LifeLock or to sign up for the service, please visit www.lifelock.com. Be sure to enter the following code to receive your member discount: ASABE.

Frequently Asked Questions About LifeLock

How is LifeLock different from credit monitoring or recovery services?

LifeLock is different because it is a system designed to prevent your identity from being stolen rather than reporting it after the fact. LifeLock maintains locks on your credit file and keeps the locks current as well as removes your name from pre-approved credit card offers. These actions render your identity useless to anyone but you. No one will be able to open any accounts without your approval.

Does LifeLock protect my credit cards and bank accounts?

LifeLock does not monitor individual credit card transactions. Most lending institutions do an excellent job with fraud protection. However, if you are a victim of credit card fraud or banking fraud, our service covers and assists you beyond what your lending institution already does for you.

Does the monthly fee include my spouse or other family members?

LifeLock charges a per person monthly fee as each individual has his/her own separate identity, such as a social security number and/or a driver’s license number. It is easy to add protection for a spouse or other family members at the discounted fee for association members. You can protect your children for an entire year for an annual fee of just $9 per child.

How does LifeLock affect my existing accounts?

LifeLock does not affect existing accounts. However, LifeLock will prevent attempts to change your address to re-route bills, credit cards, or other personal information from current credit card accounts.

How secure is LifeLock from computer hackers?

LifeLock is a preventative service and strict guidelines govern how information is stored and protected. To guarantee this high-quality protection, LifeLock hires companies to continually try to break into the system. As a result, LifeLock has earned certification from HackerSafe, a company that ensures corporate systems safety.

What is sent to verify my enrollment?

Initially, LifeLock sends a receipt and letter notifying you that your account has been established. This letter provides a detailed explanation of the service. In addition, the credit bureaus send a new copy of your credit report confirming the locks are placed on your account.

How does LifeLock backup the guarantee?

LifeLock leads the industry in providing a unique and effective identity theft prevention system; a system backed by a $1 million guarantee and guided by an experienced and reputable senior management team.

What does your guarantee cover?

Our guarantee is simple: If your identity is ever stolen while you are our client, we will fix the problem … up to $1 million dollars.

Do I need to notify LifeLock before applying for credit?

No, that is not necessary. The credit grantor will contact LifeLock if help is needed to navigate the alert process.

Help Us Grow – Recruit A Member Today

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Now a colleague or friend who would benefit from ASABE membership? Refer them to us and we will make it worth your while. ASABE’s Member-Get-A-Member Recruitment program is simple. If you refer someone who joins ASABE and lists your name as the referral on their application, you’ll receive a $20 gift certificate to be used for any ASABE product or service, including dues.

The program is open to all members of ASABE with the exclusion of student members (both undergraduate and graduate) and members from low-income countries. (Visit this link for ineligible countries: www.asabe.org/membership/intpromo.html.) Just supply us with the names, mailing addresses, and e-mail addresses of your colleagues who you feel would benefit from ASABE membership. We’ll do the rest.

Please direct all referral information to Tina Schultz, schultz@asabe.org. Sorry, but your referrals must also be non-student and non-low-income country members to be eligible.
Design Topics: A New ASABE Web-based Publications Category

ASABE’s new Design Topics are Web-based handbook-type reference materials. The ability to add these concise modules of information to the online Technical Library, rather than wait for a complete book to be developed, will speed the time to publication and avoid the high costs associated with book publishing. ASABE technical committees involved in the technology being covered will help P-515, the ASABE Textbook and Monograph Committee, ensure that the content represents state-of-the-art technology.

It is anticipated that the modules will be of primary interest to practicing engineers in industry, consultants, students, and others interested in the design of devices, systems, or processes for agricultural, food, and biological systems. The content will also be used as a resource for ASABE continuing education workshops, PE exam study material, corporate training programs, and as a supplement to college texts. Some material may provide a starting point for the eventual development of an ASABE standard or engineering practice.

The first two Design Topics modules added to the ASABE online Technical Library cover agricultural implement driveline design and dimensional analysis and similitude applied to soil-machine systems. It is anticipated that the collection will eventually cover all ASABE technical interest areas. Most entries will only be published on the Web. To view the first entries, go to asabe.frymulti.com/design_p1.asp.

Design Topic Characteristics

- Concise, stand-alone, applications-oriented modules of varying length, typically 3 to 40 pages.
- A consistent style and approach.
- Content represents the state-of-the-art and covers generally accepted concepts.
- Entries are kept up-to-date with a review at least every five years to determine if changes are needed.

Interested in authoring a Design Topic? You’ll find a Design Topic submission form at www.asabe.org/pubs/index.html. ASABE technical committees and others may also suggest appropriate design topics and recommend authors and reviewers. Please contact Donna Hull, hull@asabe.org, if you have suggestions or questions.

ASABE Distinguished Lecture Series Presented at AETC

Soil Compaction: How to Do It, Undo It, or Avoid Doing It is the title of this year’s ASABE Distinguished Lecture Series presented at the Agricultural Equipment Technology Conference (AETC) in Louisville, Ky.

Sponsored by Deere & Co., this year’s lecture series was written by Randy L. Raper and J. Mac Kirby. Raper is an agricultural engineer and lead scientist at the USDA-ARS in Auburn, Ala. Kirby is the principal research scientist at CSIRO Land and Water, Canberra, Australia.

No. 30 in the Tractor Design Series, this lecture presents the primary causes of soil compaction and suggests methods of alleviating soil compaction and methods producers can use to avoid compacting soil.

This 14-page Lecture Series is available on the ASABE Technical Library at asabe.frymulti.com or can be ordered by calling ASABE headquarters, 269-429-0300.

Bashford Honored at AETC

Leonard Bashford (r) was honored with a Certificate of Appreciation during the recent 10th AETC Conference. Bashford is retiring from the Nebraska Tractor Test Lab (NTTL) where he has been involved since the mid-1980s and director since 1998. The award was presented by Doug Durant (l), chair of the Organisation for Economic Co-operation and Development (OECD) U.S. Coordinating Committee. During Bashford’s tenure as the NTTL director, the cooperation between manufacturers and the University of Nebraska allowed for advancements in the field of OECD and ISO international standardization and has strengthened the lab’s viability for OECD tractor performance testing.
**Ensure the Profession’s Future**

The ASABE Foundation was formed to receive and administer funds for educational, scientific, and charitable purposes and to distribute funds to ASABE, or to expend funds for programs which are consistent with the purposes, goals, and objectives of the Society.

Member dues alone do not provide sufficient financial resources to allow ASABE to pursue an agenda of excellence for our profession. The ASABE Foundation does play a critical role in raising funds to support the Society. Currently, the Foundation provides funding support for the awards programs, scholarships, and special programs and activities. The majority of the Foundation funding comes from the ASABE membership. The past generosity of the members has allowed the Foundation to provide a significant level of ongoing support to the Society.

**100th Anniversary Program**

The Society is about to celebrate its 100th anniversary — a once-in-a-lifetime opportunity. Several excellent programs and activities are being planned to recognize the Society’s accomplishments and prepare for long time sustainability.

The goals and vision of the 100th anniversary programs and activities are to: a) increase awareness of the agricultural and biological engineering profession, b) increase recognition of the contributions agricultural and biological engineers and engineering have made to everyday life, c) honor and recognize those who have made significant contributions to the profession, and d) interest young people in agricultural and biological engineering as a career.

Support from the membership is necessary to implement the programs. A 100th Anniversary Fund has been established to receive donations to support the centennial programs. In addition, net proceeds from the Annual International Meeting Foundation golf outing, dinner dance, and silent auction are designated to support the centennial programs.

As we approach the centennial year, it is a time to reflect on the past and look to the future. It is a time to recognize the past accomplishments of the Society and the individual members who have helped to shape the world. A time to look ahead and address what still needs to be done to continue this legacy and help grow the Society and the profession.

**Centennial Campaign**

At the annual meeting in Tampa, the ASABE Foundation kicked off the Centennial campaign. The 100th Anniversary Fund, which is devoted to activities and programs celebrating the anniversary, is one component of the Centennial campaign.

The 100th anniversary is a perfect opportunity to highlight the values, skills, and talents ASABE members contribute worldwide. It is a time to capture the world’s imagination and recognize the contributions of the Society and the profession. It is also an opportunity for each of us as individuals and ASABE members to reflect on what the Society has meant to us in our chosen profession.

ASABE can mean a lot of different things to each of us. However, I believe we can all agree on and take tremendous pride in one aspect — ASABE has represented agricultural and biological engineering to the world with exceptional professionalism and provided an environment for members to grow professionally. We can all help to secure this position and grow the Society by means of a contribution to the Foundation.

The 100th anniversary is a once-in-a-lifetime opportunity for members to participate. Please consider making a contribution and honoring ASABE’s heritage as well as making a difference in the future of your Society and the profession.

**Ways to Contribute**

There are many avenues available to contribute to the Foundation. Pledges on dues invoices, multi-year pledges, a one time cash contribution, and gifts through estate planning are a few of the options. The Foundation has approximately 50 separate funds that are available to support the Society. Some are very specific, and others are broad in definition. I am confident you will find one or several of these of interest to you.

Contact myself, Melissa Moore, or any of the Foundation trustees for more information on the Foundation.

Gale Holloway, Foundation President

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**Silent Auction Items Needed**

The Foundation will again be holding a Silent Auction at the Annual International Meeting in Portland. Donations from sections such as gift baskets containing local specialties or local sports items are encouraged. Universities may donate school logo items, sports memorabilia, and agricultural and biological publications.

The Foundation challenges all sections, universities, companies, and members to help make this a successful silent auction. Auction proceeds will help meet the goal of ASABE’s 100th Anniversary — to promote recognition of the agricultural and biological profession and ASABE.

For more information or to donate an item, contact Linda Young, 269-429-0300, young@asabe.org.

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**Resource**

April 2006
The Shimmer of Oz  
*The third of four articles on coordinating the Annual Meeting*

For those of you who thought the wonderful world of Oz is constantly shimmering and shining for weary travelers like the Tin Woodsman, Cowardly Lion, Scarecrow, and Dorothy, you’re sadly mistaken. It takes hard work, and it’s not the result of a couple munchkins constantly polishing and shining the city or daily mopping and waxing the yellow brick road. It happens because the great and powerful Oz realizes there are limits to his immense powers, and there is a need to delegate and subcontract for specific services to be done on his behalf. This does not sound all that mystical for a wizard but … it’s practical.

The Meetings Council and Meetings Department begins this process by working and relying on historical and regional knowledge from our local Section. Their volunteer members help direct the ASABE toward new ideas or special activities tied to the selected region of the country. This local or regional flair helps give each Annual International Meeting (AIM) a sense of newness, creating a different and unique event. The local Section provides input on technical tour ideas and local businesses, cultural tours that would have particular interest for attending spouses and guests, ideas for continued professional development seminars, and they assist with finding volunteers from local or regional colleges and universities. Without the assistance from the local Section each AIM would loose its uniqueness and allure.

ASABE’s Meetings Department looks for additional assistance through contracted services providers for the AIM. These special services provide for smooth operations and a worry free environment not only for attendees and presenters, but for the ASABE staff, too. The ASABE Meetings Department begins their search by working with the local convention and visitors bureaus, contracted hotels, and convention centers requesting lists of preferred vendors and insight on each company and its product or service. With each contact ASABE learns more about the quality, dependability, and hard costs associated with each potential service provider.

After a small group of local businesses have been interviewed and references visited, ASABE’s Meetings Department issues a detailed request for proposal for the necessary service or product. Typically ASABE will annually subcontract for:
- food and beverage
- audio visual services and equipment
- destination management companies which handle the ticketing, travel, and tour guides and bulk transportation for many of our technical and cultural tours
- decorator for special signage, decorations, and exhibit booth pipe and drape
- freight delivery
- special rigging (hanging signs and banners)
- keynote and local expert speakers for various CPD seminars
- additional security for the exhibit hall
- water and electric for the exhibit hall
- housekeeping services for the exhibit hall
- printers

After receipt of each proposal from various companies, ASABE’s Meetings Department begins negotiating with each company on price, types of products or services, delivery and set-up, and on-site customer service. Upon the agreement of service, contracts are signed and ASABE’s Meetings Department dives deeper into the budget planning.

What you don’t know, to date, is that a budget is developed before a site is even selected by the Meetings Council three to four years in advance. For many of you who work with budgets you understand that they are living documents. Such a document takes on a new form with each step. The budget changes and becomes a tighter more complete document. Now that all the primary services are contracted, we can look at how ASABE is going to pay for the AIM!

Join me next month in the final of this four-part story on finding Oz as we break down budgets and answer the all important question – why do we pay a registration fee?

Mike Chesser, Director Meetings and Conferences

**Graduate Student Research Award**

Are you writing up your research for publication or a conference? Could you use a cash award? Then why not enter your paper in a competition?

ASABE invites graduate student members to submit their research manuscripts to the 2006 Graduate Student Research Award Competition. The Award recognizes excellence in the conduct and presentation of research to build the knowledge base needed by engineers who design equipment, facilities, and processes for the sustainable operation of a biological system.

The award process consists of a written and oral competition held during the ASABE Annual International Meeting. Judges will select three M.S. finalists and three Ph.D. finalists from the written competition. Those finalists are then invited to present their research at a technical session held during the Annual International Meeting.

Winners of the competition will receive plaques and the following cash awards: 1st place, $650; 2nd place, $350; and 3rd place, $150.

For further information about the competition, visit www.asabe.org/awards/competitions/Graduate_Student.html. Don’t delay! Competition entries are due at headquarters by May 1.
A WORD FROM THE PRESIDENT

Something Special … the ASABE 1/4-Scale Tractor Competition

ASABE President Otto J. Loewer, Director, University of Arkansas Economic Development Institute

It started simply enough. As ASABE president-elect, I was invited last year to attend the ASABE’s 1/4-Scale Tractor International Student Design Competition in Moline, Ill. I persuaded my wife, Betty (a farm girl), to accompany me, although seeing a tractor-pull wasn’t high on her “always wanted to” list. Don’t get me wrong. We both watched the students demonstrate their entries in this contest at the ASABE International Meeting. It was interesting enough, but we thought, “This is all there is to it.” Wrong! What we saw was truly amazing.

First, understand that this is really a weeklong event from the time that the bleachers and tents (yes, I said tents) are set up for the track to the time that they are dismantled. Bleachers? Yes, bleachers, which are under the main tent and run parallel to the track for 300 feet or so with seating for perhaps a 1,000 people.

But the shocking part was that there were 300-400 students taking part representing 25 colleges and universities. In fact, for the first time the competition even included a community college! It wasn’t that ASABE was against community colleges participating. It was that we had never considered that they would want to! In fact, I was told there have been international entries since the competition’s first year.

Adjacent to the former horse track where the event was held, the paved area near the tent had all the markings of NASCAR. There were trailers, small tents, and team shop facilities set up to keep the respective entries in the competition where winners in various categories were announced. My guess is that this is the single largest gathering of students in our profession. The pride of each participant in what he/she had accomplished was on each face reflecting that their growing network of friends and professional colleagues would somehow pay handsome dividends in the years ahead.

I came home from this event unbelievably impressed: impressed by ASABE members and their companies who gave so generously of their time and resources to make this event possible; impressed by faculty and students from across our profession who worked so hard to compete and to compete ethically while always being willing to help another team if needed; and impressed by the sponsors at all levels who helped make the event possible.

Make no mistake. The 1/4-Scale Competition is serious business. Teams give their very best with the goal of winning. But, clearly, all participants walk away from this competition as winners.

The quarter-scale competition is serious business. Clearly, all participants walk away from this competition as winners.

Resource
**1/4-Scale Tractor International Student Design Competition Enters Ninth Year**

ASABE is gearing up for the 9th Annual 1/4-Scale Tractor International Student Design Competition to be held at the Expo Gardens in Peoria, Ill., June 1-4, 2006. A field of nearly 30 teams representing the United States and Canada is expected to compete.

Each team is provided a 16-horsepower Briggs & Stratton Vanguard engine and a set of Bridgestone/Firestone tires. Teams must then design and build a 1/4-scale tractor while adhering to a strict set of rules and regulations developed by ASABE’s P-126 1/4-Scale Tractor International Student Design Competition Committee. The tractors are then judged in the following areas: written design report, team oral presentation, design judging, maneuverability, and performance (tractor pull). The competition is open to students of all disciplines and all participants must be ASABE members.

The Competition is made possible by generous support of our Platinum Sponsors from AGCO Corp., Bridgestone/Firestone, Briggs & Stratton, Case Corp., Caterpillar Inc., Deere & Co. Kubota Tractor, and New Holland North America.

For further information on specifics of the competition, please visit the ASABE Web site at www.asabe.org/students/tractor/asabecomp.html or contact Mark Crossley, crossley@asabe.org or 800-371-2723.

**AGCO National Student Design Competition**

Entries for the AGCO National Student Design Competition are due May 22. The AGCO National Student Design Competition encourages undergraduate students to participate in the basic design of an engineering project useful to agriculture and related areas. It also provides an arena of professionalism in which the student can experience peer recognition of a well conceived and executed design project.

Cash awards of $1,250, $1,000, and $750 will be presented to the first, second, and third place winning team entries during the awards recognition program at the ASABE Annual International Meeting in Portland, Ore. All participants of the top three placing entries will also receive certificates of recognition. Individuals on the first place team will each receive a desk plaque. The academic department of the first place team will also receive a $300 scholarship and a wall plaque that includes the names of the design team and their faculty advisor.

For more information visit the ASABE Web site at www.asabe.org/awards/competitions/National.html or contact Carol Flautt, awards administrator, 269-428-6336.

**Reminder – No Summer Resource for Preprofessional/Student Members**

For those preprofessional/student members who have opted to receive hard-copy delivery of Resource magazine, please be aware that this is an academic year subscription only. You will not receive hard copy issues of May through August, but you may read the full text online at www.asabe.org. You will need to log into the members-only section of the Web site to access Resource. Questions? Please call 800-371-2723.

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**2006 Student-Industry Exchange**

This year’s Student-Industry Exchange will be held at the ASABE Annual International Meeting in Portland, Ore. on Saturday, July 9, from 5:30 to 6:15 p.m. The Student-Industry Exchange is an annual event hosted by the International Preprofessional Council (IPC).

The Exchange is a great opportunity for students who are trying to find out more about their industry of interest. The Exchange can be used as a tool to make professional contacts or to simply find out the recent advances in one’s field.

In a relaxed environment, industry representatives will be available to answer your questions. You can learn about specific companies and get advice on career paths or plans of study from professionals who have been in your position.

All you have to do is look for the sign designating your area of interest. All of the professional technical areas will be represented from biological engineering to power and machinery.

We invite you to come and pose your questions to the people who know!

Courtney Fisk, IPC Advisory Board Chair

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**Preprofessional Annual Meeting Activities**

Visit www.asabe.org/meetings/am2006 for updates on all the preprofessional activities at the upcoming Annual International Meeting in Portland, Ore., July 9-12.
YPC Fun Run

The Young Professional Community (YPC) is excited to sponsor the first annual YPC Fun Run, a 5K run/walk event held in conjunction with the 2006 Annual Meeting in Portland, Ore. The Fun Run will begin at 8 a.m. on Sunday, July 9. The route will run along the Willamette River through Gov. Tom McCall Waterfront Park, which is just blocks from the convention center.

The event is open to meeting attendees and guests. Participants will receive a complimentary T-shirt and refreshments will be provided. Proceeds will help support future YPC events focused on young member retention during the transition from student to professional. Show your support for the young members of the Society while staying active. Sponsorship opportunities are available.

For more information, contact me at JohnsonCandiceL@JohnDeere.com or Audrey Alexander at Alexander_Audrey_J@cat.com.

Candi Johnson, YPC Vice-Chair

YPC Annual Meeting Activities

Several activities are planned for the meeting in Portland. YPC Chair Audrey Alexander encourages all YPC members as well as preprofessional members to attend.

Saturday, July 8
12:30-4:30 p.m. CPD – Effective Communication
5-9 p.m. Portland Underground Tour and Dinner

Sunday, July 9
8 a.m. YPC Fun Run
5:30-6:15 p.m. Student-Industry Exchange
6:30-8 p.m. Welcome Reception

Monday, July 10
7-8 a.m. About ASABE Info Session

Tuesday, July 11
5-6 p.m. YPC Business Meeting

Cooperative Standards Program

Completed Revisions to Existing Standards

ANSI/ASABE S279.13 DEC2005, Lighting and Marking of Agricultural Equipment on Highways. This revision addressed two issues: aligning the standard with ISO 16154 (Tractors and machinery for agriculture and forestry - Installation of lighting, light signaling and marking devices for travel on public roadways) and brake light and high speed equipment.

ANSI/ASABE S483.1, Rotary Mower Blade Ductility Test. This standard was updated to include new testing procedures to improve the quality of the blade production.

ASABE EP496.3, Agricultural Machinery Management. This revision corrected errors and simplified and clarified an equation.

ASABE D497.5, Agricultural Machinery Management Data. This revision updated Figure 1 and corrected the slippage issue.

For more information, contact ASABE Standards, 2950 Niles Road, St. Joseph, MI 49085-9659 USA; 269-428-6331 or 269-429-0300 ext. 315, fax 269-429-3852.
On Feb. 23, the Student Mechanization Branch of the Monterrey Institute of Technology in Monterrey, Mexico, visited Bell, part of the BETA group, in Torreón, Coahuila. Bell produces milk, cream, yogurt, and other dairy products.

The group had the opportunity to interact with the dairy cattle industry and to learn more about the technology involved in the business. The group also had the opportunity to visit the company’s crops with fertirrigation, pivot, side-roll, and drip irrigation systems, as well as other agricultural technologies.

“It’s important for students to have contact and experience the aspects behind a highly competitive product,” says Branch President Fernando Maciel.

The mechanization branch organizes events such as trips, meetings, and machinery demonstrations to offer an environment for Tec’s students to interact with technology and innovations in the agricultural industry. The learning opportunities are tremendous, and students are encouraged to participate in these activities where they can observe actual applications of irrigation, food production, processing, and other technology.

Fernando Maciel, Mechanization Branch President
ASABE Conferences and International Meetings
To receive more information about ASABE conferences and meetings, contact ASABE at 800-371-2723 or mcknight@asabe.org. For the complete list, see www.asabe.org/resource/asabevents.html.

2006

April 9-12   International Symposium on Hydrology and Management of Forested Wetlands. New Bern Convention Center, New Bern, North Carolina, USA.
June 1-4   ASABE 1/4-Scale Tractor Student Design Competition. Expo Gardens, Peoria, Illinois, USA. Contact Randy Clark, clark@rcengineering.com or Jerome Robillard, jmrobillard@blount-fied.com.
July 9-12   ASABE Annual International Meeting. Oregon Convention Center, Portland, Oregon, USA.
July 24-26   2006 World Congress of Computers in Agriculture (WCCA). Grosvenor Resort, Lake Buena Vista, Florida, USA.

2007

Feb. 11-13   Joint Agricultural Equipment Technology Conference and Third International Conference on Crop Harvesting and Processing. Louisville, Kentucky, USA.
March 11-13   Fourth Conference on Watershed Management to Meet Water Quality Standards and Emerging TMDL. San Antonio, Texas, USA.
June 17-20   ASABE Annual International Meeting. Minneapolis, Minnesota, USA.
Sept. 15-19   International Symposium on Air Quality and Waste Management for Agriculture. Broomfield, Colorado, USA.

ASABE Section and Community Events
For more information, contact the person identified in each listing. For the complete list, see www.asabe.org/resource/community.html.

2006

April 28-29   Alabama Section. Auburn University, Alabama, USA. Contact Yifen Wang, wangyif@auburn.edu.
May 10   Puerto Rico Section. Agricultural Experiment Station Library, University of Puerto Rico, Botanical Garden, Rio Piedras. Contact Megh Goyal, mgoyal@uprm.edu.
June 1-3   Florida Section. 2006 Annual Conference and Trade Show. Jupiter Beach Resort and Spa, Jupiter, Florida, USA. Contact www.fl-asabe.org or flasabeadmin@asabe.org.

July 31-Aug. 3   NABEC Meeting. McGill University, Macdonald Campus, St. Anne de Bellevue, Quebec, Canada. Contact Paul Heinemann, hzh@psu.edu.

ASABE Endorsed Events
For more information, contact the person identified in each listing. For the complete list, see www.asabe.org/resource/endorsevents.html.

2006

Nov. 9-11   5th International Conference of the Asian Federation for Information Technology in Agriculture. Bangalore, India. Sponsored by the Asian Federation for Information Technology in Agriculture. Contact afita2006@yahoo.com, www.insait.org.

Other Events
For more information, contact the person identified in each listing.

2006


To have an event listed here, send information to Suzanne Howard, 2950 Niles Road, St. Joseph, MI 49085, USA; fax 269-429-3852, howard@asabe.org. Information must be received at least two months before the event.
RESEARCH ENGINEER
Biological Systems Engineering
University of Nebraska-Lincoln

Conduct research on near-infrared spectroscopy and hyperspectral imaging to improve food quality, safety and security. Perform image and spectral data analysis, write journal articles, assist with grant writing, supervise student employees, and maintain lab. B.S. in agricultural engineering, biological systems engineering, electrical engineering, computer science, food science or related field plus two years relevant research work experience required. M.S. preferred and will substitute for the work experience. Instrumentation experience preferred. Expected to pursue a higher degree, while employed. Excellent benefits including staff dependent scholarship program. Position funding beyond 2 years is contingent upon grants. Review of resumes will begin: May 1. Apply at http://employment.unl.edu. UNL is committed to AA/EEO and ADA/504. If you require an accommodation, please call (402) 472-1412.

Assistant/Associate Professor. The Department of Agricultural and Biosystems Engineering at The University of Arizona invites applications for a faculty position in the area of Controlled Environments for Agriculture and Plant Production Systems. The Department and College expanded its focus in 2000 to include CEA (controlled environment agriculture) program with focus on areas including design and operations of greenhouse and other controlled environments, plant production systems, hydroponic and nutrient delivery systems, and bio-regenerative life support systems. For full details, qualifications & to apply for job #34393, please visit The University of Arizona website at https://www.uacareertrack.com. Be prepared to attach Curriculum Vitae, Letter of Interest and a Statement of Research and Teaching Interests. Applications will be reviewed beginning February 22, 2006 and continue until position is filled. The University of Arizona is an EEO/AA Employer-M/W/D/V.

Assistant Professor, School of Agriculture, Murray State University. This is a nine-month, tenure track position to begin August 2006. **Qualifications:** Doctorate in Agricultural Systems Technology/Mechnization or related field preferred. Masters in Agriculture Systems Technology or related field and a minimum of two years of documented successful teaching required. Bachelor’s degree in Agriculture Systems Technology or related field and demonstrated skills in communications, human relations, and leadership in the field of Agriculture Systems Technology required. **Responsibilities:** Teach 12 hours each semester, including courses in metal work, power and machinery, electricity, surveying, buildings and construction and agricultural safety. Also, advise students and student organizations, participate in research and scholarly activities, serve on committees and provide service support to agriculture. Teaching styles and methods must emphasize hands-on, practical educational learning experiences for students. **Application Deadline:** May 5, 2006. **To Apply:** Send letter of application, vita, copies of transcripts, three current letters of recommendation to: Amy McKinney, Assistant Professor Agricultural Systems Technology, Screening Committee Secretary, School of Agriculture, 103 South Applied Science, Murray State University, Murray, KY 42071-3345. Women and minorities are encouraged to apply. Murray State University is an equal education and employment opportunity, M/F/D, AA employer.

**ASSISTANT RESEARCHERS** for biomass gasification and fermentation research studies: Oklahoma State University Biosystems & Agricultural Engineering department seeks applicants for two full time Assistant Researcher positions to provide research support and leadership in either thermochemical conversion of biomass or fermentation of producer gas from the gasification of lignocellulosic biomass. Details about each position may be found at www.biosystems.okstate.edu/nwservlet/Employment. These positions, available immediately, are full time, non-tenure track faculty appointments for two years with additional appointments dependent upon funding and performance. Applicants must have an earned doctorate in Biosystems Engineering, Agricultural Engineering, Chemical Engineering or a closely related field and have demonstrated abilities in conducting and reporting research work in the respective area of emphasis. Eligibility for professional engineering registration is required. Review of applications will begin April 10 and continue until position is filled. Applicant packets (resume, transcripts, and contact information for three references) may be mailed to Search Committee/Gasification or Search Committee/Fermentation, Biosystems & Agricultural Engineering, Oklahoma State University, 111 Ag Hall, Stillwater, OK 74078-6016; faxed to (405) 744-6009; or emailed to ron.elliott@okstate.edu.

OSU AA/EO institution committed to Multicultural Diversity.
Faculty Position in Biological Engineering

POSITION: Assistant Professor of Biological Engineering

RESPONSIBILITIES: The Department of Agricultural and Biological Engineering is currently seeking applications in the area of biological engineering for a full-time tenure-track position at the Assistant Professor level. This position is part of a comprehensive growth plan for biological engineering at Purdue University. Successful applicants are expected to establish a renowned research program focusing on the integration of biological sciences into engineering applications involving agricultural, food processing, environmental, bioprocessing, biomaterials, or other applications of principles in the life sciences. Areas of interest include, but are not limited to, metabolic engineering, cellular biomechanics, biomimetics, biobased products and fuels, bioreactor design, and bioseparations. Biophysical, bioinformatic or systems biology approaches to engineering problems are encouraged. The central criteria for this position are excellence in research and the ability to teach undergraduate and graduate students in the biological engineering area. Successful candidates are expected to be highly interdisciplinary. Opportunity exists for joint appointments in departments within the Colleges of Engineering and Agriculture as well as participation in high impact multidisciplinary research centers within Discovery Park. This position is associated with the College of Engineering’s Tissue and Cellular Engineering signature area (https://engineering.purdue.edu/Engr/Cluster/TCE/).

QUALIFICATIONS: Applicants must have earned a Ph.D. or equivalent degree, with an engineering degree or background highly desirable.

CLOSING DATE FOR APPLICATIONS: Review of applications will begin April 14, 2006. The position will remain open until filled.

APPLICATION MATERIALS: Letter of interest, resume, official academic transcripts, statement of teaching and research philosophies, and names, addresses and phone numbers of three references. Applications should be submitted electronically to: http://engineering.purdue.edu/Engr/Cluster/Applications. If you have difficulty submitting your application to this website, please contact Ms. Marion Ragland at ragland@purdue.edu. Review of applications will begin April 14, 2006 and continue until filled.

CONTACT: Questions regarding position may be addressed to:
Dr. Osvaldo Campanella, Search Committee
Email: bioenagr@ecn.purdue.edu or Phone: (765) 496-6330

For additional information see http://www.purdue.edu/ABE

PURDUE UNIVERSITY IS AN EQUAL OPPORTUNITY / EQUAL ACCESS / AFFIRMATIVE ACTION EMPLOYER

Applications from women and minority candidates are strongly encouraged.

Nature of Position: Conduct research on the integration of electronics and intelligent control systems in machines and machine systems. Work at the mechanics-electronics interface in designing, building, and evaluating advanced control systems for enhancing agricultural and other biological systems. Establish a nationally recognized research program with internal and extramural support. Teach courses in support of the undergraduate Biosystems Engineering degree program, including the area of instrumentation and controls. Actively participate in graduate education through recruiting and advising M.S. and Ph.D. students, with the opportunity to each graduate courses. Work collaboratively with faculty in Biosystems and Agricultural Engineering and other units in the Division of Agricultural Sciences and Natural Resources (DASNR) and the College of Engineering, Architecture and Technology. Opportunity to contribute to an active, multi-disciplinary, research and development program in precision agriculture and to DASNR’s sensor-based technologies team.

Qualifications: Earned doctorate in Biosystems Engineering, Biological Engineering, Agricultural Engineering, Mechanical Engineering, Electrical Engineering, or a closely related engineering discipline. Eligible to be licensed as a registered professional engineer or an engineering intern. Expertise required in electronics instrumentation and control system design. Experience preferred in the design and integration of electronic and mechanical systems for agricultural and/or biological applications. Familiarity with site-specific agriculture and information technologies is desirable. Candidates must have excellent speaking and writing skills, an ability to teach effectively at the undergraduate and graduate levels, and a desire to work collaboratively in an interdisciplinary environment.

Employment conditions: Full-time, 11-month, tenure-track faculty appointment at the rank of Assistant professor. Salary commensurate with qualifications.

Application Deadline: Screening of applications will begin May 1, 2006. Applications will be accepted until a candidate is selected for the position.

Application Process: Interested, qualified persons will submit application packet consisting of resume, transcripts, and a list of at least three references with complete contact information to:
Dr. Ronald L. Elliott, Professor and Head
Faculty Search – Mechatronics
Biosystems and Agricultural Engineering Department
Oklahoma State University
111 Agricultural Hall
Stillwater, OK 74078-6016
Fax: (405) 744-6059 Phone: (405) 744-5431
Email: ron.elliott@okstate.edu

Oklahoma State University is an AA/EO Employer committed to Multi-Cultural Diversity.
Faculty Positions Bio-based Renewable Energy Cluster

The College of Engineering and the College of Agriculture and Natural Resources are establishing a center for bio-based renewable energy. A cluster of new academic tenure system faculty positions has been established within these two colleges to complement the activities of current faculty working in this area. It is anticipated that this cross-college group of faculty, graduate students and post-doctoral research associates will grow significantly over the next few years. These new faculty positions are all academic tenure system positions (9 month appointment) one will be an Assistant/Associate Professor in the Departments of Biosystems & Agricultural Engineering, and Chemical Engineering & Material Science, one will be at the Assistant Professor level in the Departments of Biosystems & Agricultural Engineering and Forestry; the third position will be at the Assistant Professor level in the Departments of Chemical Engineering & Material Science and Biosystems & Agricultural Engineering. Candidates may apply for consideration for all the positions or only one specific position. Please note on the cover letter how you would like to be considered (for any of the three positions or just a specific one).

The candidates are expected to develop nationally recognized, externally funded research programs and to provide leadership in educational and outreach programs in the areas of bio-based energy and bio-based products. Examples of topical areas include biological/microbological conversion processes, thermo-chemical conversion processes, enzymatic and catalytic conversion concepts, conversion of biomass to liquid and gaseous fuels including hydrogen, integration of biomass production/conversion/ utilization concepts, plant metabolic engineering and other relevant topics. Candidates are expected to have a Ph.D. in a related field of engineering or science with demonstrated credentials in research, scholarship, and teaching as appropriate for either the assistant or associate professor level.

Applications are invited to send their curriculum vitae, a statement of plans for research, teaching and outreach and the names and addresses of three references to Professor Bruce Dale, Search Committee Chairperson c/o Ms. Priscilla Gardner Bioenergy Faculty Positions Bio-Based Renewable Energy Cluster, Agricultural Hall East Lansing, MI 48824-1323; e-mail address gardne27@msu.edu; phone 517-353-6777, fax 517-432-2892. Applications received by May 31, 2006 will receive full consideration; however, the search will continue until a satisfactory pool of candidates has been identified. Electronic and/or paper applications are welcome.

Michigan State University, a research intensive premier Land Grant University, enjoys a park-like campus of over 2,000 developed acres and over 3,000 acres of outlying research facilities and natural areas. The campus is adjacent to the city of East Lansing and the capital city of Lansing. The Greater Lansing area has approximately half a million residents. The local communities have excellent school systems and place a high value on education. Michigan State University is pro-active in exploring opportunities for the employment of spouses, both inside and outside the University. Applicants who are not U.S. citizens or permanent residents must provide documentation verifying employment authorization in the United States.

Applications from women and individuals in underrepresented groups are strongly encouraged.

ASABE Career Center

The ASABE Career Center – the most comprehensive career and recruiting site for the agricultural, biological, and food engineering industries – is now available for your use. The Career Center offers extensive résumé and position databases, powerful and user-friendly searching capabilities, which allow you to find the job or candidate you’re looking for!

Employers

- Post your job to the largest exclusive audience of industry professionals.
- Online management of job postings, including activity reports.
- Access to a searchable résumé database.
- Competitive job-posting pricing.

Job Seekers

- The ASABE Career Center is dedicated exclusively to the agricultural, biological, and food engineering industries and it’s free.
- Receive automatic notification of new jobs matching your criteria.
- Post your résumé – confidentially, if preferred – so employers can actively search for you.

ASABE cares about your career development. Lifelong learning is a pre-requisite to any successful career – and we are committed to providing resources to help our members grow. Visit www.asabe.org/membership/careercenter.htm and start using the ASABE Career Center to make your career connections!
Professional Listings

Miller Engineering
Idaho
Boise-Twin Falls
208-326-4729
www.millerengineering.com
E-mail: jmiller@millerengineering.com

Agricultural and Mechanical Engineering

1000 Promontory Dr.
Uniontown, KS 66779
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John A. George, P.E.

www.agengineering.com

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Your personal or company consultant business card could appear here. For information on rates, contact Pam Bakken, Advertising Sales Manager, Resource: Engineering & Technology for a Sustainable World, 2950 Niles Road, St. Joseph, MI 49085-9659 USA; 269-428-6337, fax 269-429-3852, bakken@asabe.org. An order form is available at www.asabe.org/resource/procards.pdf.
Responding to the President

Switching to switch grass in the Southeast can lead the way

John S. Cundiff

In his State of the Union Address on Jan. 30, 2006, President George W. Bush stated the need to wean the United States from oil. He specifically mentioned wood chips and switch grass as potential sources of renewable liquid fuel.

Switch grass, a warm-season perennial, is native to the tall-grass prairie. Beginning in 1978, the Department of Energy (DOE) Biofuels Feedstock Development Program – now terminated – did 15 years of research to adapt switch grass for other areas of the country, specifically the Southeast. A recent DOE report announced a goal to produce one billion tons of biomass annually for bioenergy and bioproducts. The potential of the Southeast was estimated at 250 million tons, second only to the Midwest.

Farming renewable energy in the Southeast

There is discussion in the DOE-USDA reports of a 5,000-ton-per-day biorefinery. The projections appear to enroll farmers as efficient producers of a bulk commodity. Farmers are the “serfs” who insure a supply of cheap energy to the urban population. This concept may be appropriate for the West where farms encompass large land holdings. It is not the correct concept for the Southeast.

The Southeast has some unique characteristics that suggest the “European Model” is more appropriate. In Europe, renewable energy power plants are being built about 97 km (60 miles) apart. These plants are smaller and are supplied with biomass from farms within a 48-km (30-mile) radius at a delivered price of $60-70/ton. They supply electricity and steam to the town and surrounding farms. The community is united, not divided, by their power plant. All citizens – farmers and townspeople – benefit, and all lend their political support to renewable energy.

The Southeast is characterized by relatively small farms, an extensive network of roads, and a uniform distribution of towns. Towns developed about 48 km (30 miles) apart when the region was settled because a mule-drawn wagon could go about 24 km (15 miles) to town and then return home in one day.

The European Model envisions a plant that co-generates electricity from biomass and supplies process steam to an “over-the-fence” partner, perhaps a manufacturing plant attracted to the community by a desire to produce their product with “green energy.” And, the creation of jobs prevents young people from leaving rural communities and further concentrating the U.S. population in urban centers.

The United States is not well served by continued concentration of our population in sprawling cities. Opportunities to supply energy and waste-disposal needs with sustainable technology are greater with a distributed population. Smaller towns with small power plants – the European Model – provide a better socioeconomic future.

Distributing the power

Biomass is a distributed resource. It contributes best when used closer to the field or forest where it is produced. The ability of the United States to meet the energy needs of Southeastern citizens with renewable, sustainable resources is best accomplished with distributed power generation. It is time to stop focusing on large power plants and biorefineries where the increase in hauling cost for the biomass obliterates the economy-of-scale benefit in processing cost the large plants provide. There is an optimum size for these plants. The Europeans say they should be spaced 97 km (60 miles) apart. Let’s find out what the optimum spacing is for the Southeast and get busy and build a distributed energy system that shows the way for the rest of the nation.

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