

May 2006

Resource



Engineering & Technology for a Sustainable World

Star Quality in Stubble

Home Sweet, Energy-Efficient Home

Standards Sessions a Big Hit at AETC

PUBLISHED BY ASABE - AMERICAN SOCIETY OF AGRICULTURAL AND BIOLOGICAL ENGINEERS

A lawsuit can have a domino effect



A single legal problem is more than just an isolated incident. If you're sued, it not only impacts your career, but also your family, savings, etc.

That's why protection against the threat of a lawsuit is essential today. And when you need help, you want it from someone you can trust.

You can trust the ASABE-Sponsored Professional Liability Program. It gives you:

- Protection for you and your business at affordable group rates.
- Low deductibles and limits up to \$1 million.
- Expert legal counsel to represent you.
- Affordable claims-made coverage.

Don't let a lawsuit domino into a major life event. Protect yourself with the ASABE-sponsored Professional Liability Program.

Plus, you can apply easily right now. Simply log on to www.insurancetrustsite.com/asabe for more information and an application.



You can also call toll-free
1-800-642-5725
for more information.



ASABE-Sponsored Professional Liability Program



LifeLock
Take control.

15 million identities will be stolen this year. Don't let it happen to you.

Identity theft is the fastest growing crime in America. It happens at a startling rate of one identity stolen every 2.1 seconds.

There is a safe and simple way to prevent this from happening ... a way that will allow you to protect yourself and your family and raise money for your association.

Do yourself and your association a favor. Stop identity theft and sign up for a service you will value for a lifetime.

www.asabe.org

Coming in the June/July issue of *Resource*:

AE50 Awards

Winners of the 2006 *AE50* competition are showcased in this special section. Photos and descriptions of each award-winning product are the highlights of our June/July *Resource*.



Guide to Consultants

Our annual listing of professional engineers and engineering firms can be pulled out and saved for future, handy reference throughout the year. The 2006 *Guide to Consultants* is inserted in the center of the magazine.



Resource

Engineering and Technology for a Sustainable World

Vol. 13 No. 4

May 2006

FEATURES

7 A Shining Star in Stubble

"The sky is the limit," says author David Gregor, "when it comes to StubbleStar® establishing a crop through a load of stubble." No-tillers take note: Gregor and company has a seeding opener with sky-high possibilities and star quality, winner of *Best Australian Agricultural Machine*.



page 7

9 Home Sweet Home

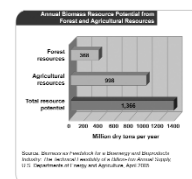
"ASABE does not include human housing as a designated area of expertise among its members, but I want to give them some technical ideas of general interest. Engineers *must* lead the way with green lifestyles," urges Allen Zimmerman of The Ohio State University. Zimmerman offers his practical knowledge as well as his personal testimonial.



page 9

11 Biomass Technologies

In the third installment in a series on energy, Jim Fisher and colleagues address "the most widespread, versatile, and potentially valuable of all sources of renewable energy" – biomass. The most basic and essential, biomass is found everywhere, and bio-industries, predicts Fischer, will soon be everywhere as well.



page 11

13 CTF Makes Tracks in Australia

"Precision-controlled traffic farming integrates the benefits of permanent traffic lanes and uncompromised soil to achieve a more productive, profitable, and sustainable agriculture," asserts author Jeff Tullberg. "Large-scale, practical, on-farm controlled traffic is a new system providing many challenges and opportunities for machine/crop system research *and* more prosperous customers for the farm machinery industry."

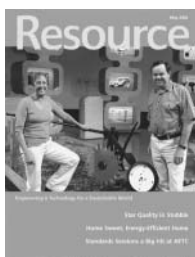


page 13

DEPARTMENTS

Update	3	Professional Listings	28
Personnel Service	26	Last Word	29

ON THE COVER



A star is born! "I don't know about the United States and other countries, but here in Australia, it is unusual for agricultural or biological engineers to get on television," comments David Gregor, "but there I was with Professor Deirdre Lemerle and StubbleStar® on the set of the 'New Inventors.' " StubbleStar® was an episode winner and collected the finalist's prize in the Australian Broadcasting Corp.'s television program.



Standards Sessions a Big Hit at AETC

- 15 Two standards-related technical sessions held at the recent Agricultural Equipment Technology Conference in Kentucky, were well-attended and generated excellent dialogue among both presenters and attendees.

"Oh, the Places You'll Go ... "

Dr. Seuss

Have you traveled near or far? — or just lately booked a flight to an interesting climb?

Resource is casting about for travelogues from ASABE members and friends ... from those whose passports bear stamps of newly experienced, exhilarating places ... edifying, exciting, educational sightseeing from the agricultural/biological engineer's viewpoint.

From a work/career perspective, was your journey enlightening and, maybe, eye-opening? In Seussian style, did your memory and camera record

"mazelike streets, colorful checkerboard landscapes, even muddy blue 'slumps' "?

Send your feature-article reminiscences and digital memories to be included in an upcoming travel-focus issue! If you've stepped off a plane in the last year or so — or will be boarding shortly, we want to hear about and share the journey!

Please contact Sue Mitrovich, mitro@asabe.org. Your story may be the passport to a feature article for many armchair voyagers!



Do you have an opinion?

Why not share it? *Resource* seeks timely and thought-provoking op/ed articles for "Last Word" on a regular basis. Express yourself on a topic of interest to the readership! Contact me with ideas, suggestions, and rough drafts, and thanks for reading *Resource*.

Sue Mitrovich, *Resource* Features Editor
2950 Niles Road, St. Joseph, MI 49085-9659 USA
269-429-0300, ext. 313 mitro@asabe.org

Annual International Meeting

Portland, Oregon

July 9-12, 2006

Register Today!

Early Bird Deadline May 12

www.asabe.org/meetings/aim2006/index.htm

800-371-2723

Resource

Engineering & Technology for a Sustainable World
VOL. 13 NO. 4

Resource: Engineering & Technology for a Sustainable World (ISSN 1076-3333) (USPS 009-560) is the membership publication of ASABE — the Society for engineering in agricultural, food, and biological systems. The Society is a not-for-profit professional and technical organization of members worldwide interested in engineering knowledge and technology for food and agriculture, associated industries, and related resources. The magazine maintains executive, editorial, subscription, and advertising offices at ASABE headquarters, 2950 Niles Road, St. Joseph, MI 49085-9659, USA; 269-429-0300, fax 269-429-3852, hq@asabe.org.

Magazine staff: Donna Hull, Publisher, hull@asabe.org; Sue Mitrovich, Features Editor, mitro@asabe.org; Suzanne Howard, *Inside ASABE* and Update Editor, howard@asabe.org; Pam Bakken, Advertising Sales Manager and Production Editor, bakken@asabe.org.

Editorial Advisory Board: Chair Edward C. Martin, University of Arizona; Vice Chair Suranjan Panigrahi, North Dakota State University; Secretary Jeremiah D. Davis, Iowa State University; Past Chair Anissa D. Morton, Enviro Ag Engineering Inc.; Wayne Coates, University of Arizona; Donald M. Edwards, Retired; Fouad Jaber, University of Florida; Mark R. Riley, University of Arizona; Brian Steward, Iowa State University; Alan G. Van Nahmen, Farm Buddy; Wade W. Yang, Alabama A&M University; and Joseph M. Zulovich, University of Missouri.

A subscription to *Resource: Engineering & Technology for a Sustainable World* is included in the annual ASABE membership dues. Annual nonmember subscription rates are \$86 including postage in the United States. Add \$25 for postage outside the United States. Overseas airmail rates available on request. Single issues are available for \$5.50 for members, \$7.50 for nonmembers.

Contact ASABE order department, 269-428-6325. An application for membership can be obtained by contacting ASABE.

Change of address: Send recent mailing label and address with ZIP code. Allow four weeks for change to become effective.

Postmaster: Send address changes to *Resource*, 2950 Niles Road, St. Joseph, MI 49085-9659, USA. Periodical postage is paid at St. Joseph, MI, USA, and additional post offices.

Permission to reprint articles available on request. Reprints, in black and white or color, can be ordered in large quantities for a fee. Contact Donna Hull, 269-428-6326. Electrostatic reprints of individual articles, issues, or entire volumes may be purchased from University Microfilms, Box 1346, Ann Arbor, MI 48106, USA; 800-521-0600.

Statements in this publication represent individual opinions. *Resource: Engineering & Technology for a Sustainable World* and ASABE assume no responsibility for statements and opinions expressed by contributors. Views advanced in the editorials are those of the contributors and do not necessarily represent the official position of ASABE.

Copyright 2006 by American Society of Agricultural and Biological Engineers.

ASABE officers: Otto J. Loewer, President; Jerry L. Wille, Past President; Charles E. Sukup, President-Elect; Ronald L. McAllister, Treasurer; M. Melissa Moore, Executive Vice President.

ASABE council chairs: Kenneth L. Hellevang, Meetings Chair; Paul H. Heinemann, Membership Development Chair; Dwayne R. Edwards, Publications Chair; Roger M. Hoy, Standards Chair.



American Society of
Agricultural and Biological Engineers

2950 Niles Road, St. Joseph, MI 49085-9659, USA
269.429.0300 fax 269.429.3852 hq@asabe.org www.asabe.org



Improving quality of irrigation water

Managing irrigation water quality to sustain crop production and deliver positive environmental outcomes is in sight with a new Water Quality Calculator now available online.

Developed by CSIRO Plant Industry and the Cotton Catchment Communities Cooperative Research Centre in Australia, the Water Quality Calculator allows irrigators to assess the quality of their water and improve it.

The Water Quality Calculator can determine the salinity, sodium adsorption ratio, and pH of the irrigation water supplied when different sources of water are combined, says Dirk Richards of CSIRO.

Released in February, the Water Quality Calculator was developed following requests from cotton industry extension officers and irrigated producers in Central Queensland, Australia.

The Water Quality Calculator was initially developed with cotton in

mind and will be helpful to cotton irrigators across the Australian industry, but it also can be used to determine potential effects in a number of other irrigated crops including pasture, according to Richards.

The Water Quality Calculator can be found at www.cotton.crc.org.au/CottonLOGIC/WQC/. It is free for users once they have registered. Users can then create their own water sources and compare different combinations to assist with managing their irrigation water.

Center selected to lead national ag safety initiative

The High Plains Intermountain Center for Agricultural Health and Safety at the University of Colorado received \$504,000 to lead a group of 10 university-based agricultural safety and health research centers in a national initiative to prevent deaths and serious injuries from tractor roll-overs.

The two-year grant from the National Institute for Occupational Safety and

Honeycrisp apple named a top innovation that changed the world

The Honeycrisp apple, developed by University of Minnesota researchers and introduced to the public in 1991, has been named one of “25 Innovations That Changed the World.”

The Honeycrisp story is part of the inaugural edition of *The Better World Report*, produced by the Association of University Technology Managers (AUTM), a non-profit group dedicated to bringing academic and nonprofit research to people around the world.

Lest you think this is a mundane accomplishment for the Honeycrisp, consider the company of the other 24 innovations on the list. There's the V-Chip, the Habitrol nicotine patch, an electronic hearing implant, and Google.

The report touts Honeycrisp both for its ephemeral pleasures and its long-term economic benefits. The apple “with almost magical properties,” the report says, “... marries sweetness sought by some and tartness touted by others, and it thrives in the hard climate of northern-tier states.” The

apple is also known for being “explosively crisp,” with flavor and texture that preserve well over time.

AUTM points out that the Honeycrisp's contributions go well beyond flavor. Upper Midwest apple growers were faced with tough times in the '80s and '90s, as apples from Washington state and overseas were dominating the market,

and locally grown apples were, at times, being sold for less than they cost to produce.

Honeycrisp came along in the early 1990s as a premium apple at a premium price. Orchards found that the public was hungry for the apples and willing to pay the price, and their profits rose accordingly.

The Honeycrisp was developed by Jim Luby and David Bedford, two University researchers who work at the Minnesota Agricultural Experiment Station. The apple has

grown in popularity around the United States and in other countries, such as New Zealand and South Africa, and more than two million trees have been planted.

To view the complete report, visit www.autm.net/documents/06BetterWorldReport.pdf.



The Honeycrisp apple, developed by University of Minnesota researchers, was introduced to the public in 1991. (Photo by Dave Hansen, courtesy of the University of Minnesota)

Health (NIOSH) will help the centers build and launch a national public health campaign for preventing deaths and serious injuries from tractor-related incidents that are a leading cause of accidental death in rural communities.

Tractors overturning onto the operator, or people being run over, becoming entangled in power takeoffs, and collisions with non-farm vehicles on public roads are the leading cause of death and serious injury in the nation's agricultural industry. More than 250 farmers, family members,

and farm employees die annually in such incidents, half of them when a tractor overturns and crushes the operator.

"The funding will allow the NIOSH-supported Centers for Agricultural Disease and Injury Research, Education, and Prevention and the National Children's Center for Rural and Agricultural Health and Safety to fill current gaps in their knowledge base and to explore new techniques to promote safer tractor use," says Steve Reynolds, director of the High Plains Intermountain Center for

Agricultural Health and Safety (HICAHS) at Colorado State University. HICAHS will lead the initiative.

Although no official statistics are available, University of Kentucky researchers estimate that 4.46 non-fatal injuries occur for every fatality caused by an overturned tractor. These injuries are often severe and disabling. They also can be financially devastating, causing immediate and long-term medical expenses and the loss of family farms when an owner-operator is incapacitated.

"We are pleased to support this initiative, which enables the centers to join in an unprecedented team effort on this compelling public health issue," says NIOSH Director John Howard. "Finding effective ways to promote tractor safety is a tremendous national challenge to which we and our partners are bringing new resources.

"By 2007, building on the results of this effort, we will be in a good position to seek the involvement of all the stakeholders affected by tractor injuries and fatalities: farm and safety groups,

Applied robotics research is leading to new applications in agriculture

Robots are on the march again into the last bastion of labor intensive industry – farming and horticulture. Research engineers and horticulture specialists at the University of Warwick, Coventry, U.K., are working together to devise a suite of robots and automated systems which could transform farming and horticulture over the next decade.

The researchers from the University of Warwick's horticultural arm, Warwick Horticulture Research Institute (HRI), and its manufacturing engineering section, Warwick Manufacturing Group, are working on a number of robotics and automation products that will vastly reduce the labor costs of farmers and growers. Two of these projects include a robotic mushroom picker and inflatable conveyor belt.

The robotic mushroom picker uses a charged coupled camera to spot and select only mushrooms of

the exact size required for picking, achieving levels of accuracy far in excess of human labor. The mushrooms are then picked by a suction cup on the end of a robotic arm. While the speed of picking is currently just over half that of a human – the mushrooms and the robot can be set to pick 24 hours a day without the need for any sort of break. The researchers hope to increase the speed of picking to much closer to that of a human worker.

The other project is an inflatable conveyor belt. The Warwick Manufacturing Group and Warwick HRI researchers have helped Aeropick, an agricultural machinery company, develop a revolutionary group of inflatable harvesting aids which provide huge savings on labor costs. The inflatable conveyor system can be driven into an open field or covered growing area. Within minutes up to 100 m (110 yd) of powered conveyor belt can be deployed allowing crops to be processed at high speed to cool storage, washing, or simply sorting and grading while still in the field.

For more information, contact Peter Dunn, p.j.dunn@warwick.ac.uk.



This robotic mushroom picker uses a charged coupled camera to select mushrooms that are the right size for picking. (Photo courtesy of the University of Warwick)

equipment manufacturers and dealers, government agencies and legislators, educators and outreach specialists, and most importantly, farmers, ranchers, and their families. Together, we can make a difference,” Reynolds says.

The centers represent a major NIOSH effort to protect the health and safety of agricultural workers and

their families. They were established as part of a NIOSH initiative in 1990 to address the nation’s pressing agricultural health and safety problems. Nine centers located in every part of the country respond to the issues unique to each region.

For more information, contact Reynolds, 970-491-3141, Stephen.Reynolds@colostate.edu.

Fuel alcohol from pea starch

So you don’t like eating peas? Then how about fueling your car or truck with them? That’s a possibility scientists are exploring – using a type of fuel called ethanol, made from the legume’s starch.

Ethanol is among the cleaner-burning alternatives

to petroleum, and is credited with reducing tailpipe emissions of carbon monoxide and other pollutants when added to gasoline.

In 2004, some farmers contacted Agricultural Research Service (ARS) microbiologist Nancy Nichols about new ways to add value to their field pea crops. Most peas grown in the northern United States

New sensor helps guarantee freshness

Grocers, florists, and even pharmacists may soon have a better way to monitor the quality of the products they get from suppliers: a sensor that will tell how long before a product spoils or passes its expiration date.

A team of University of Florida engineering students has designed and built a prototype of the new smart sensor, which can also record and wirelessly transmit information to retailers about when and where glitches occur as a product is being shipped.

“We think this sensor will make the perishable supply chain both safer and more efficient,” says ASABE member Bruce Welt, an assistant professor of agricultural and biological engineering and a faculty adviser on the project. “Hopefully, that will translate into lower cost, better quality products for consumers.”

Many shippers today are reluctant to use disposable tags or labels that turn color or otherwise indicate if a product has passed its prime. One problem is that the tags don’t say when spoilage occurred. Nor do they tell whether “fresh” goods will soon spoil. The former can make it hard to decide who is responsible when a spoiled product arrives. The latter can result in stores stocking merchandise that appears fine but quickly goes bad. Because products have different spoilage rates and temperatures, the tags have to have contain different chemicals or otherwise be tailored to individual products. That raises their cost and increases the possibility of errors.

Shippers also rely on temperature monitors that indicate if, and by how much, a product’s recommended trucking temperature has been exceeded. That’s a problem because the devices may record excessive temperature near only one pallet of many pallets stacked together in one shipping container. That can force the entire shipment to be discarded even if most remained very near or within temperature guidelines.

“The reality is that for small violations of these temperatures, the products are fine but get thrown away anyway,” Welt says.

With Bill Eisenstadt, an associate professor of electrical and computer engineering, leading the technical development, six seniors majoring in engineering developed what Welt calls a “sensor platform” that is capable of tracking and interpreting not only temperature but also humidity, the shock of a product being dropped, and other variables.

In the temperature setting, the half dollar-sized device checks the temperature. It then merges its readings with an algorithm, or set of computer instructions, that electronically mimics the spoilage characteristics of milk, fish, flowers, or whatever product is being shipped. The device can communicate its results constantly and in real time via a wireless transmitter.

Retailers can use a laptop to instantly check the status of an incoming product, learning not only whether it is fresh but also how long it has until it spoils – and at what point, if any, temperatures spiked above normal during shipping.

Eisenstadt said a patent application has been filed for the device and that the team recently received a \$15,000 grant to continue developing the technology this summer.

For more information, contact Welt, bwelt@ufl.edu, or Eisenstadt, wre@tec.ufl.edu.



UF electrical engineering senior Moishe Groger holds a “smart sensor” that can tell retailers who receive a shipment of goods how long it will be before they spoil or pass their expiration date. (Photo by Kristen Bartlett, University of Florida)

and elsewhere are fed whole to animals as a rich source of protein. The remainder is sold for human consumption as split peas. Besides protein, field peas also contain lots of starch. The farmers thought they might earn more if the crop's starch could be used to make ethanol for fuel, while still using the leftover protein as high-value feed for animals.

To find out, Nichols teamed with Bruce Dien, a chemical engineer; Victor Wu, a chemist; and Mike

Cotta, a microbiologist – all at the ARS National Center for Agricultural Utilization Research in Peoria, Ill. There, they put whole peas through a three-step process.

First, they dry-milled the peas into flour. Next, they separated the protein and starch. Finally, they used enzymes and yeasts to ferment the starch's sugars into ethanol.

During studies, the fermented pea starch produced somewhat less ethanol than

corn because the legume had less starch to begin with. But the pea starch fermented just as easily as corn starch. Potentially, the high yield of enriched protein, together with the fermentation leftovers, could be sold as livestock feed.

Economic modeling studies are now underway to determine whether using pea starch could be profitable to commercial ethanol plants, especially those located in areas where the legume is grown.

For more information, contact Nichols, nicholnn@ncaur.usda.gov, or Dien, dienb@ncaur.usda.gov.

Normal people vs. engineers

"Normal people ... believe that if it ain't broke, don't fix it.

Engineers believe that if it ain't broke, it doesn't have enough features yet."

*Scott Adams
American cartoonist*

John Deere part of basketball history

Farmers are known for fashioning makeshift parts and even inventions when they see a problem to solve. Arthur Ehrat, an Illinois farm boy and retired grain elevator manager from Virden, Ill., used a John Deere cultivator spring to solve a basketball coach's problem in the 1970s and changed forever how basketball is played.

Ehrat took an old metal basketball hoop and added a magnet and a John Deere cultivator spring to create what is known today as the breakaway basketball hoop.

The patented idea, nicknamed, "The Rebounder," has become a fixture in gyms, allowing players to dunk more easily without damaging the rim or backboard.

"My nephew, Randy Albrecht, was coaching basketball at St. Louis University at the time, and we were talking about how the players were bending up the rims and breaking bones trying to dunk the ball," Ehrat remembers. "I thought ... that ought to be an easier problem to solve than the ones we were having spreading fertilizer and chemicals. I went and bought a \$20 rim and sat on the porch with it trying to figure out what I could do."

Fascinated with magnets as a boy, Ehrat decided a magnet could be used to hold the rim firmly but still allow it to break away under pressure. Using a hinge, similar to the ones found on the heavy doors at the elevator, to make the hoop swing up and down, some bolts, and several springs,

he worked with a local farmer-mechanic to turn the idea into reality.

Ehrat found that most of the springs he tried were too loose or too tight to bounce back with the right velocity. After giving the problem some thought, he considered how easily the springs on a John Deere field cultivator moved as the equipment bounced through a field and figured the springs had to have about the right amount of tension. He got a spring from his local John Deere dealership and gave it a try. The rest, as they say, is history.

"I was already familiar with the patent process, because I had applied for and received two patents for equipment changes for spreading fertilizer and chemical," he says. "It took me six years to get the patent for the hoop, but it finally came through in 1982."

In the 17 years it was in effect, Ehrat spent a good deal of time and money defending the patent, which he licensed to nearly every basketball hoop manufacturer. The Smithsonian Institute and each of his seven grandchildren have one of Ehrat's early prototypes. In addition, he loaned his original prototype to the Basketball Hall of Fame in Springfield, Mass., for display for about four years.

"I don't know a lot about basketball. I did not have time to be interested because of the responsibilities on the farm. Our school gym had no rim or ball," he says. "When I watch games now, I wait for the dunk. I love to watch them dunk the ball."



Arthur Ehrat changed the way basketball is played when he designed a breakaway basketball hoop using a John Deere cultivator spring. (Photo by Barb Baylor Anderson, Deere & Co.)

A Shining Star in Stubble

New no-till opener glistens in its field

David Gregor, Glen Riethmuller, and J. N. Tullberg

Worldwide, the biggest problem faced by no-till farmers is an almost total reliance on herbicides for weed control. StubbleStar®, a new no-till seeding opener developed through a research project sponsored by the Cooperative Research Centre for Australian Weed Management, tackles this issue head on. The StubbleStar® aids no-till crops by giving a natural competitive advantage over weeds and takes the pressure off herbicides to help lengthen their useful life before resistant weeds evolve.

Three Australian ASABE members, David Gregor, the inventor of the StubbleStar® concept, Glen Riethmuller, and Jeff Tullberg working in close consultation with weed scientist Deirdre Lemerle, have helped to develop and test the novel no-till seed and fertilizer opener. Its unique design, characterized by two star-shaped disks running together at a small angle to each other, promises effective reduction of both weed numbers and weed biomass with the potential for fewer herbicide applications. Better still, it allows solid-stand seeding through heavy crop residue with less tractor fuel and reduced soil erosion risk.

In no-till farming environments, herbicides are commonly used to knock down weeds, after which crops are sown into stubble and weed trash. The quantity and quality of crop and weed residue currently limit the ability of some machinery (particularly hoe openers) to sow crops in narrow rows.

Planting in narrow rows allows the crop plants to compete favorably with weeds for light, moisture, and nutrients. In addition, stubble on the soil surface and in the seed zone and the amount of soil disturbance at sowing can all affect where and when weed species grow and the early health and vigor of the crop. This factor is extremely important in organic cereal production, where weeds cause major problems when not properly managed during early crop establishment. It is also important to non-organic



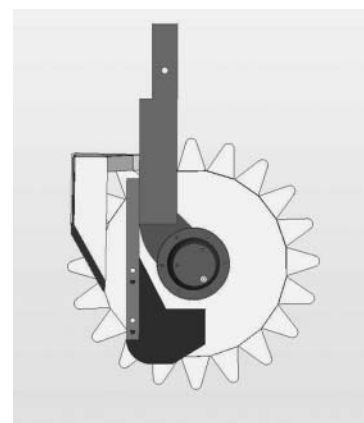
StubbleStar® no-till seeder opener showing stars and tooth cleaners.

growers whose future is threatened by the development of herbicide tolerant weeds. An effective no-till seeding machine can extend the life of existing herbicides in a number of ways, primarily by checking weed growth and favoring crop seedlings during early crop establishment.

Conventional double-disk openers, operating in soft soils with damp stubble mulch, will often push straw into the seed furrow, but points on the star (termed “teeth”) part the straw as they enter the soil. A proportion of the straw is then sliced as it runs up the edges of the teeth. Consecutive teeth then grip the straw at the intersection where consecutive teeth meet and tear it apart as the stars diverge. Uncut straw is pulled back up from the furrow as the stars rotate and is stripped from the teeth as it passes the tooth cleaners. The difference between the way the new

StubbleStar® penetrates through stubble to loosen the soil and the operation of a conventional double disk is similar to the comparison between a garden digging fork and a garden spade.

The left- and right-handed 20-point star-shaped blades are offset at eight degrees to each other and every tooth is formed at a four-degree angle to the plane of the star. This means that the inner faces of the teeth from the left star mate with the inner faces of the teeth from the right star as they enter the soil. By the time the teeth leave the soil, they are operating at an angle of almost 16 degrees to



Cutaway view showing the fertilizer furrow leveling blade for consistent seeding depth.

each other which is enough to lift and fracture the furrow wall in a process similar to an “inverted T” hoe-type opener. The stars aerate the furrow walls, unlike a conventional double disk which creates a V-shaped furrow prone to smearing and compaction.

Nitrogen or mixed fertilizer is deposited into the serrated furrow created by the star teeth. A specially designed blade then fills the serrations, and places seed with starter

fertilizer into the newly leveled furrow bottom. This configuration gives a consistent seed depth into loosened soil and the positive separation between seed and harmful fertilizer.

StubbleStar® checks weeds in the following ways:

- Operates in thick mulch so that weed seedling emergence is naturally suppressed;
- Throws a minimal amount of soil to keep weed seeds high and dry and maintain surface mulch;
- Runs on narrow row spacings so the crop beats the weeds to moisture and light;
- Places fertilizer directly below seed to feed the crop and not the weeds;
- Seeds into moist soil so crop seedlings emerge ahead of weeds and not vice versa;
- Minimizes covering depth, meaning the crop gets up in minimal time;
- Clears straw from the row to increase soil temperature and reduce phytotoxic effects;
- Loosens soil below the seed for faster root growth and reduced fungal pathogens (such as rhizoctonia).

Depending on the competitive ability of the crop being grown, the StubbleStar® can make a significant contribution to managing weeds in no-till crop production. Tested against a conventional inverted-T-style hoe opener in 2004, where oat seed was broadcast onto trial plots (to simulate weed seed dropped in the previous year) and lupins (a historically uncompetitive crop) were seeded immediately, the StubbleStar® reduced weed biomass substantially.

Trials conducted on wheat in Western Australia in 2005 showed that the StubbleStar® gets significantly more seedlings out of the ground than conventional disks and, just as many as hoe openers, without the hassles of straw blockages. These trials led to some minor modifications to the StubbleStar®, including the new furrow leveler to fill the indents made by the star teeth. This resulted in more consistent seeding depth and more positive separation

between seed and fertilizer. The research team also added a press-wheel for better seed covering and improved seed/soil contact.

Another topical issue is the current use of fossil fuels and the production of greenhouse gasses by the agricultural sector. Drawbar dynamometer readouts taken during the 2004 trials showed that when operating at 8 km h⁻¹ (5 mph) and at a depth of 38 mm (1.5 in.), the StubbleStar® used

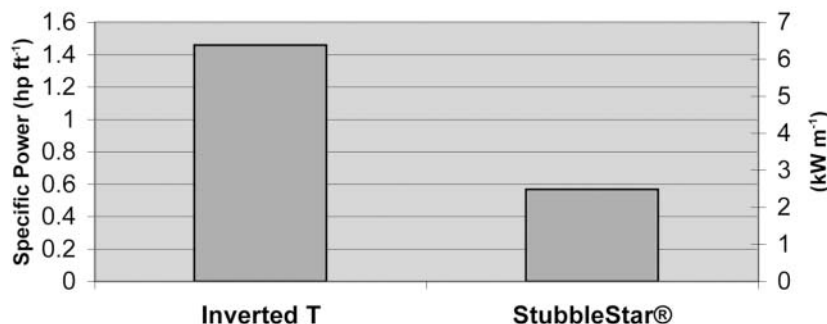
3.9 kW m⁻¹ (1.6 hp ft⁻¹) of machine width less than the inverted-T, narrow hoe opener. This translates into a potential fuel saving of 1.5 L ha⁻¹ (0.16 US gal acre⁻¹) and a direct carbon dioxide saving of 4.7 kg ha⁻¹ (4.2 lb acre⁻¹).

In September 2005, StubbleStar® was presented the prestigious *Best Australian*

Agricultural Machine award. This award was conferred by the Tractor and Machinery Association of Australia at the 2005 Henty Machinery Field Days. This accolade followed StubbleStar® being an episode winner and grand finalist in the Australian Broadcasting Corp.'s “New Inventors” television program.

The Cooperative Research Centre for Australian Weed Management has engaged commercialization specialist, FTS Technology Services, Melbourne. The specialist seeks a commercial partner in the agricultural equipment industry to take this new technology to the world market. So for all those no-tillers out there who have “hit the wall” in terms of establishing crops through ever-increasing stubble loads, with the StubbleStar® the sky really is the limit. **R**

**Drawbar power requirement per width pulled @ 5 mph
(8 km h⁻¹)**



The award-winning StubbleStar® opener produced less weed biomass than a hoe opener in a lupin crop.

ASABE member David Gregor is senior research engineer with the New South Wales Department of Primary Industries, Wagga Wagga Agricultural Research Institute, PMB, Wagga Wagga, New South Wales 2650, Australia; 61-2-6938-1907, fax 61-2-6938-1861, david.gregor@dpi.nsw.gov.au.

ASABE member Glen Riethmuller is senior agricultural engineer with the Department of Agriculture, Western Australia, working at the Merredin Dryland Research Institute, PO Box 432, Merredin, Western Australia 6415, Australia; 61-8-9081-3111, fax 61-8-9041-1138, griethmuller@agric.wa.gov.au.

ASABE member J. N. Tullberg, recently retired from the University of Queensland, Australia, as lecturer and engineer, is a consultant with CTF Solutions, www.ctfsolutions.com.au; phone/fax 61-73378-5249, jeff@ctfsolutions.com.au.

Home Sweet Home

Keep it simple with energy-efficient home construction

Allen Zimmerman

The importance and need of continued improvement in energy efficiency in the transportation, industry, and buildings sectors is well known. Therefore, the increased interest in green homes on the part of the American public is significant and noteworthy since conserving energy is fundamental to making any building green. Unfortunately, many people have the misconception that an energy-efficient house requires far-out designs, exotic materials, and/or complex assembly techniques. In fact, building an energy-efficient home can be readily accomplished by incorporating simple and straightforward construction techniques using standard materials and based on sound engineering design principles and practices. Examples of these techniques (all of which are code approved) include advanced framing, raised-heel trusses, airtight drywall approach, frost-protected shallow foundations, and optimizing window design.

Advanced framing

The advanced framing technique is based on the concept of minimizing the use of wood members that are not needed for structural support in framing the exterior of the house. Energy efficiency is increased (insulation replaces the wood components deleted) and the amount of wood used is reduced. Elements of advanced framing include nominal 5 × 15-cm (2 × 6-in.) studs located on 61-cm (24-in.) centers; two-stud corners; single member wood headers; elimination of unneeded trimmer (jack) and cripple studs in rough openings; elimination of headers in non-support walls, windows in alignment with regular studs, single top plate (trusses need to be stacked directly above the studs); drywall clips (instead of wood backer components); and rigid insulation exterior sheathing (eliminates thermal bridging).

Raised-heel trusses

Regular trusses (and rafters) prevent an adequate depth of ceiling insulation from being installed in the attic areas adjacent to the top plate. The effect of this missing insulation is a substantial reduction in the overall R value of the installed ceiling insulation (typically in the range of 25 percent). Raised-heel (energy) trusses are designed such that their bottom and top chords extend well beyond the top plate. As a consequence, these trusses enable a full depth of ceiling insulation to be installed adjacent to and over the

top plate. Raised-heel trusses not only significantly reduce heat movement through the ceiling but also result in wide roof overhangs. The

wide overhang has two additional advantages: 1) it reduces solar gain in the summer by providing considerable shading of south-facing windows (but does not substantially reduce solar gain in the winter due to limited shading of these same windows), and 2) it provides additional protection from rain for exterior walls, doors, and windows.



Raised-heel trusses bearing on an exterior wall top plate.

Airtight drywall approach

Air leakage is the uncontrolled air movement into and out of houses via the building envelope. Limiting and controlling air leakage is important for energy efficiency because

uncontrolled air leakage can represent up to 50 percent of the annual heat gain and loss in a house. In addition, air leakage is the major mechanism by

which moisture is transported into building shell cavities. Up to 95 percent of the moisture movement into house walls and ceilings is due to moisture “hitchhiking” as part of the air leaking into these spaces (as opposed to vapor diffusion through surface covering materials). Other negative effects of uncontrolled air leakage include drafts and cold spots, low indoor relative humidity in the heating season, and high indoor relative humidity in the cooling sea-



Sealed holes in a top plate as part of the airtight drywall approach.

son. Therefore, houses should be *built tight and ventilated right* (using controlled mechanical ventilation systems).

The airtight drywall approach is a simple and reliable method for effective air sealing of houses. Advantages include low material and labor costs, specialized materials and subcontractors are not required, and the drywall panels can be glued to the face of wall studs and ceiling joists. The airtight drywall approach is based on the fact that drywall (and its taped joints) and wood (lumber) are excellent air barriers. Therefore, the interior finish of drywall on walls and ceilings is used in combination with structural building components and sealants (caulks, foams, and adhesives) to form a continuous air barrier and achieve a tight house. The airtight drywall approach method of air sealing is completed in three stages – before, during, and after drywall installation – and the process and procedures are easy to learn and perform.

Frost-protected shallow foundations

Protecting footings for houses and other buildings from damage due to frost heaves is typically accomplished by installing the footings below the frost line. For homes without basements, the construction options usually considered are 1) a separate footing, foundation curtain wall, and concrete slab or 2) a separate footing, foundation curtain wall, and crawlspace. Both of these options involve considerable material, equipment, and labor resources and costs which increase in relation to the required frost-free depth. Excessive heat loss and humidity problems (in the case of crawlspaces) are also common.

Frost-protected shallow foundations provide a third alternative. In this construction technique, rigid insulation is used to provide frost protection without the need of deep footings. The required footing depth is only 30 cm (12 in.). The building footing, foundation, and floor are constructed at the same time and consist of an integral monolithic slab thickened at the edges. Frost-protected foundations are a well-proven energy-efficient, cost-effective technique.

Optimizing window design

Windows have a major effect on the energy efficiency of a home and also perform a number of other functions. Therefore optimizing window design requires careful consideration of and compromise among factors not directly related to energy efficiency such as code requirements,

views, and aesthetics. In terms of energy efficiency, window design should take into account heat loss and gain during both heating and cooling seasons, natural lighting, and ventilation. High-quality, low-e, gas-filled, double-pane windows with low air-leakage rates have become standard stock items and should always be selected.

South-facing windows make effective passive solar collectors, and the house design should include an appropriate (but not excessive) number of these windows. The number of north-facing windows should be limited (to reduce heat loss during the heating season) and the number of west- and east-facing windows should also be limited to a lesser extent (to reduce heat gain in the summer). Movable interior window coverings such as shades and blinds can also be valuable in reducing heat loss and gain. When all window functions have been considered in total, a typical optimal design might have the following representative specifications: 1) total window area – 12 percent of the floor area and 2) percent of total window area by compass direction: south 40 percent, east 30 percent, west 20 percent, and north 10 percent.

What about costs?

Some of these techniques will result in slightly higher initial costs whereas others will have lower initial costs. However, when these methods are incorporated into houses that are designed and constructed based on the “building as a system” approach, any higher initial costs related to energy efficiency can typically be offset by subsequent lower initial costs for other components. As one example, the furnace and air conditioning units and their distribution systems can be substantially downsized in an energy-efficient house which results in considerable savings. Obviously, the annual costs of an energy-efficient house will be much lower for the entire life of the structure!

It is also important to realize that an emphasis solely on initial costs or payback periods fails to take into account the many other benefits of energy-efficient homes. At the societal level, an energy-efficient house has considerable value in that energy and material resources are conserved and pollution is reduced. Major benefits to homeowners and occupants are homes that are comfortable, safe, healthy, durable, quiet, and affordable in addition to being energy efficient. How so? *I can personally attest to this.*

Since 2000, my wife and I have lived in this type of house (which I designed and built) and have experienced and enjoyed all of the attributes listed. An additional bonus: annual heating costs to heat our moderately-sized [201 m² (2,165 ft²)], all-electric home located in northern Ohio have averaged \$350, and there are no cooling costs (air conditioning is not required). R

ASABE member Allen Zimmerman is a professor at The Ohio State University, 1328 Dover Road, Wooster, OH 4469; 330-264-3911, fax 330-262-7634, zimmerman.7@osu.edu.



Constructing a frost-protected shallow foundation (monolithic slab as an integral footer, foundation, and floor).

Biomass Technologies

James R. Fischer, Brian Lavoie, and Janine Finnell

Of all sources of renewable energy, biomass is perhaps the most widespread, versatile, and potentially valuable. Virtually every region of the country has biomass resources. Biomass is varied, providing a range of useful characteristics, depending on the nature of the plant (e.g., woody or herbaceous) and on which parts of the plant are used (e.g., grains, leaves, branches). Genomics can enhance desirable characteristics, enabling the design of biomass to meet specific purposes. The United States' significant biomass resources can provide a large amount of transportation fuel, contribute to electric generation efficiency and grid reliability, and supply bio-based chemicals and materials, many of which could replace petroleum-based products. With focused effort, the early 21st century will see the rise of an expanded bio-industry.

A history worth repeating

Biomass has always been a cornerstone of the U.S. economy. Agriculture and the forest product and paper industries, for example, supply large volumes of valuable commodities each year. Along with these goods, biomass is widely used to make fuel, electricity, and heat, as well as a number of consumer and industrial products. The U.S. fuel ethanol industry, which exploits the starch resources in corn kernels and other grains, is a significant contributor to the transportation fuel supply. Production of fuel ethanol topped 14.8 billion L (3.9 billion gal) in 2005. Ethanol facilities can make other products synergistically, including corn syrup and animal feed. Renewable resources can also be chemically transformed into clean-burning diesel fuels. Biodiesel is made through transesterification from waste cooking oils, soybeans, and other oilseed crops, with glycerine as a co-product. Bio-oil made through pyrolysis of biomass can replace fossil fuels, including diesel, in some applications.

Catalytic processes can also transform biomass feedstocks into diesel. The U.S. Energy Policy Act of 2005 calls for 28.4 billion L (7.5 billion gal) per year of renewable fuels such as these by 2012. Biomass has also been used to generate electric power and heat. There are over 9,000 MW of installed generating capacity in the United States that are fueled by forest product and agricultural residues, municipal solid waste, and methane gas from decomposition at landfills. Other countries are developing bio-industries as well. A notable example is Brazil, where ethanol from

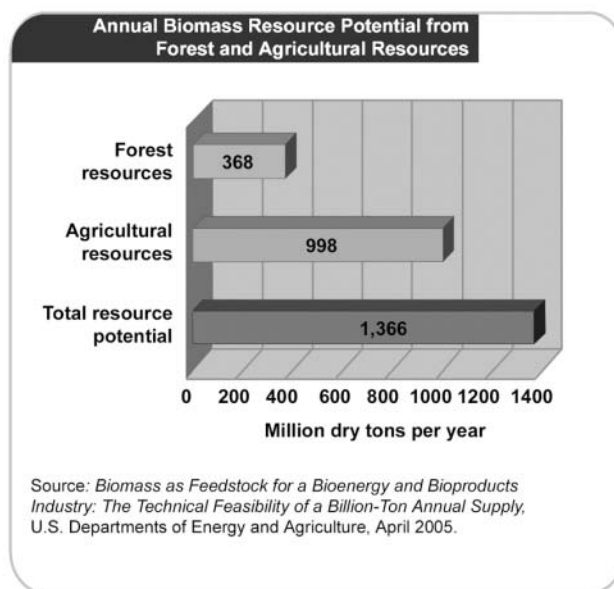
sugar cane is helping the country achieve energy independence.

The future's bio saga unfolds

New technologies are bringing additional sources of cellulose into sustainable, environmentally sound use. Unused resources, like agricultural residues or forest residues, can supply a large quantity. In the future, crops such as switch grass and hybrid poplar trees, designed and grown for the express purpose of producing energy and/or specific commercial and industrial products, could supply an even larger amount. Municipal solid waste is

another potential source. Biomass resources in the United States could potentially reach 1.3 billion dry tons per year – enough to supply fuel replacing almost a third of current gasoline demand as well as other products.

Current research emphasizes development of breakthrough technologies that could exploit biomass resources to produce a variety of products, all made in biorefineries. Like oil refineries, biorefineries are envisioned as industrial facilities that convert a stream of raw material into a varied slate of products, maximizing value by shifting the mix of outputs to match dynamic market conditions. Potential biorefinery products include everything that could be made in an oil refinery – liquid fuels, such as ethanol and



Potential biomass resources are significant, and they also include municipal solid waste.

The Biorefinery

biodiesel, electricity, steam, and high-value chemicals and materials. An example of a product made with biorefinery technology is Toyota Motor Corp.'s bioplastics, used to make automobile components. Already used in the Toyota Raum (sold in Japan), this plastic is made from sweet potatoes and other plants. Another example is DuPont's Sorona, a family of polymers made from 1,3-propanediol (PDO) that can be used in fabrics, plastics, and in other applications. PDO can be made from sugars derived from corn.

"First generation" biorefineries already exist in the agriculture and forest products industries. For the next generation, researchers are developing new processes for exploiting the energy contained in cellulose. One prominent pathway involves biochemical transformation of agricultural residues – excess material currently unused and left on fields. Examples of this feedstock include corn stover, wheat straw, and rice straw.

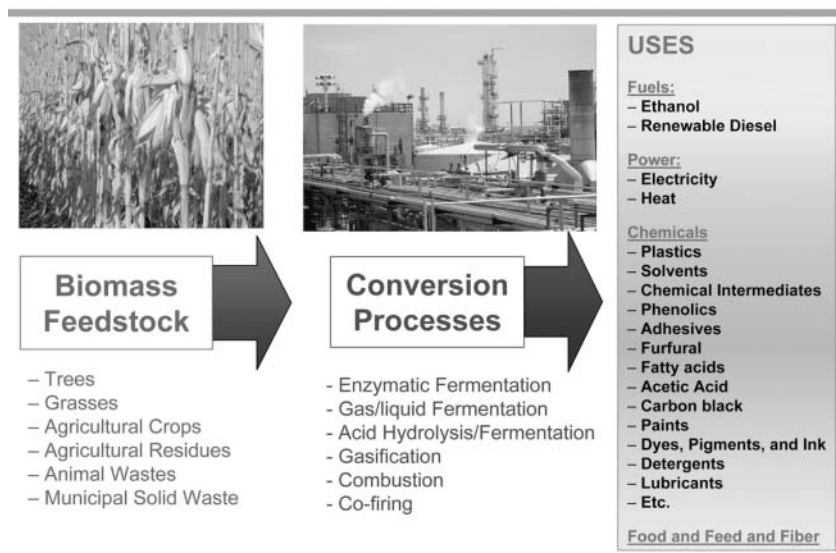
Herbaceous energy crops, like switch grass, could supply additional large quantities. This process uses enzymes to break apart cellulose molecules, creating sugars that can be fermented into ethanol or processed further to create industrial and consumer products. Lignin from biomass, unusable to make sugars, could be burned for electricity and heat, made into additional products, or gasified for multiple uses.

Bio directions are many

Another pathway involves subjecting biomass to elevated temperatures, often in the presence of steam, to transform it into a gaseous state. This may be the technology best suited to woody feedstocks – forest residues collected to reduce wildfire risk or short-rotation trees, like poplar, grown specifically to make industrial and consumer products and energy. Herbaceous residues and crops could also be used, however. Gasifying feedstocks yields synthesis gas, or syngas, rich in hydrogen and carbon monoxide, which can be used to produce a variety of outputs. Hydrogen from syngas can be purified and used to operate fuel cells making electricity or powering vehicles. Syngas can be transformed into fuels and other chemicals through the Fischer-Tropsch process, a well-known and commercially utilized technique. Research has also been conducted to use specialized bacteria to turn syngas into useful products. Fuel outputs include diesel and gasoline. The products of gasification can also be combusted for heat and power, either directly or after re-combination into methane (natural gas).

Bio bonuses

The benefits of expanding the U.S. bio-industry are potentially large. They include decreased dependence on



Like oil refineries, biorefineries make a slate of products to serve multiple markets.

petroleum imports, resulting in more security of supply, lower fuel prices, and a better foreign exchange balance, as well as carbon emissions reductions and rural economic development. Commitment to biomass would also help the U.S. competitive position with other countries, particularly in the European Union, that are also pursuing leadership in this 21st century industry. Continued research and development by government and industry and favorable public policies to spur adoption of new technologies will help speed the transition to an expanded bio-industry and achieve these benefits. **R**

For further reference, see:

- U.S. Department of Energy Biomass Program Web site: www.eere.energy.gov/biomass/
- Report on potential biomass resources: http://feedstockreview.ornl.gov/pdf/billion_ton_vision.pdf
- Report on potential bio-based products: www.eere.energy.gov/biomass/pdfs/35523.pdf

ASABE member James R. Fischer is a senior technical advisor – academe on the board of directors with the Office of Energy Efficiency and Renewable Energy at the U.S. Department of Energy, 1000 Independence Ave. SW, Washington D.C. 20585; 202-586-1394, fax 202-586-2096, James.Fischer@ee.doe.gov.

Brian Lavoie is an associate with Technology & Management Services, Inc., 955 L'Enfant Plaza N., SW, #1500, Washington, D.C. 20024; 202-554-5161, blavoie@tms-hq.com.

Janine Finnell is a senior associate with Technology & Management Services, Inc., 955 L'Enfant Plaza N., SW, #1500, Washington, D.C. 20024; 202-554-4636, fax 202-554-4676, jafinnell@yahoo.com.

CTF Makes Tracks in Australia

Wheeling and dealing for healthier soil

J. N. Tullberg

Wheels work better on hard soil; plants grow better in soft soil.

True for the great majority of soils and crops, but ignored by most farmers in the developed world. Research in the United States and Europe demonstrated the problems of random field traffic 50 years ago, but large-scale adoption of controlled traffic by first-world farmers has occurred only in Australia and only since the mid-1990s.

Controlled-traffic systems – those with heavy wheels restricted to permanent traffic lanes – are in place on one to two million ha (2.5 to 5 million acres) in Australia. Improvements in field efficiency, timeliness, and fuel requirement motivated initial adoption, but the outcome has been a profound transformation of farm systems toward zero tillage and opportunity cropping.

What do we know to be important in terms of the science and practice of controlled-traffic farming (CTF), and what are its future directions? It is important to note that most hard evidence to date simply proves what we know already: wheel traffic causes soil damage and reduces yields in most circumstances.

Controlling field traffic transforms random soil damage into a concentrated field trafficability benefit, but it is only the starting point for CTF. The major effects are the system changes and multiple benefits possible when farming healthier soil. The system advantages of CTF are the

“With global positioning systems, it's not difficult to get all the heavy wheels on permanent wheel tracks. The harvester and tractor are on the same track width, and the distance between the center lines of harvester and tractor – pulling a grain bin or a seeder – is the same as the width of the header and the seeder.”



important outcome, something heard about from 200 farmers and consultants at the CTF05 Conference last year.

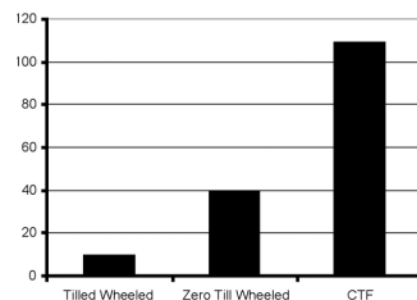
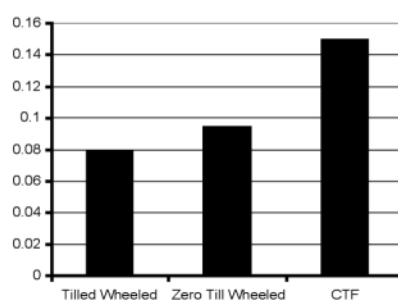
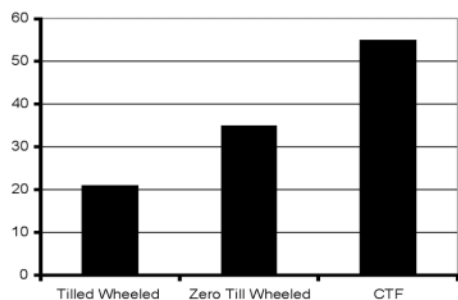
What's known?

Soil in optimum condition for plant growth is relatively weak and permeable. When a wheel or track rolls over that soil, it compacts until it is strong enough to carry the applied load. The processes of transmitting surface loads to lower layers of the soil are not straightforward, but it is generally accepted that tire pressure is the most important factor in surface damage. Total axle load has a greater effect on subsurface damage and the depth to which it penetrates.

In most soils, natural processes will slowly repair that damage from the surface downward. This occurs at a time scale in years at a 20-cm (7.9-in.) depth, even on “self-ameliorating” soils.

Natural processes or tillage can hide surface damage quickly, but with heavy wheels driving over at least 50 percent of field area per crop, root zone damage is almost universal in cropped soils.

Most soil damage occurs instantly on the first wheel pass. Second and subsequent wheel passes do little further damage if they are on the same track. Fixing the damage takes years. Damage is less severe on dry soil, but extreme wheel loads imposed by the largest grain harvesters penetrate a long way down the profile and certainly below the



The impact of traffic and tillage in bars graphs (l to r): rainfall infiltration measured in an 80 mm/h (3 in./h) storm; plant-available water capacity, 0-30 cm (0-12 in.) after two years CTF; earthworm numbers, 0-15 cm (0-5.9 in.) average over two years.

maximum depth of traditional deep tillage.

The bar charts on the previous page illustrate the impact of damage on infiltration rate, plant-available water capacity, and soil life. This data is from Queensland's black vertisols, but broadly similar outcomes have been found in totally different soils in Victoria, Western Australia, China, and other parts of the world. For all practical purposes wheeled soil produces more runoff and absorbs less rainfall, stores less moisture in plant-available form, and is less able to cycle nutrients.

The soil damage process also absorbs power. More than 20 percent of a tractor's power is usually lost in the soil under the wheels when operating on normal field surfaces. This power is dissipated in rolling resistance and slip, in the process of compacting and increasing the strength of surface soil. The draft, as well as drawbar power requirement of tilling or planting, is greater by at least 40 percent in the stronger soil of random-trafficked fields.

Restricting field traffic to permanent laneways significantly reduces the power wasted in the traction process. The reduction in implement power requirements for planting or tillage is even greater. Eliminating the surface ruts and damage of random-wheel traffic also gets rid of another major reason for tillage. Controlled traffic farmers commonly end up with tractors 30 to 50 percent smaller.

In CTF soil disturbance is required only where there is an identified need, and then it will require much less energy than current tillage. Less is spent on owning and operating equipment and a healthier soil is achieved, which makes a greater proportion of rainfall available to crops.

What's next?

Much is known about the problems caused by wheel traffic and some of the direct benefits when the problems are eliminated. Little is known about the broader system effects, because conventional crop agronomy is concerned with the management of damaged soil.

More about the immediate challenges of controlled traffic and the solutions is being learned. Australian farmers and their suppliers have been the major innovators in adopting high-precision guidance systems, moving to a common track width, and achieving modular track and working widths. These are the immediate requirements of lining up all heavy wheels on permanent laneways. More is



"Tractor modifications, like the one above, were regularly undertaken by Australia's controlled traffic farmers until Deere began production of its 3-15 m (10-50 ft) option in 2004. Tractor, sprayer, and harvester all operate from the same set of permanent tracks (see photograph on previous page). The usual system is a 9-m (30-ft) planter and harvester and 27-m (90-ft) sprayer. Most are fitted with precision GPS auto-steer systems, which allow interrow planting/fertilizer application," explains the author.



"This JCB tractor has GPS antenna for precision guidance on the cabin roof," Tullberg notes.

being learned about the immediate benefits: more rapid access to paddocks after rain; more efficient, timely operations with less power; less wasteful fertilizer and herbicide application; less unnecessary soil disturbance; more moisture, more planting opportunities, and better crops. More value is now received from yield maps and satellite images, which are no longer compromised and confused by random traffic.

Amazingly little is known about the integration of this set of opportunities and benefits or the new challenges that might arise. The depth and breadth of the topic has not yet registered on institutional research radar. There is still little discussion of the new opportunities that might come from, for example, breeding crops, managing fertilizer inputs, or improving herbicide application in this improved soil environment.

The Western world's agricultural research community often ignores machinery system effects. This is an important problem; machinery issues are often a major limitation. CTF would be easier and cheaper if:

- More tractors and harvesters could operate on agreed standard track widths, e.g., 2 m and 3 m (6.6 and 9.8 ft).
- Planter-depth control was independent of load-bearing wheels.
- Accurate implement guidance could be achieved with drawbar equipment.
- Harvesters transferred products into multiple towed bins to allow quality differentiation.

These could all contribute to optimizing cropping systems free from constraints of random wheel traffic. This is largely a matter of taking advantage of the opportunities of improved timeliness and greater precision. It includes the use of greater precision to better target the application of fertilizer and herbicide; capitalizing on the ability to access growing crops without causing damage; and planting a second crop between the stubble rows of the harvested crop immediately if soil moisture is available (often possible in a subtropical environment).

Research institutions might address some components of this challenge, but most system issues will have to be sorted out by farmers, individually and in groups, working cooperatively with consultants, industry, and science. **R**

ASABE member J. N. Tullberg, recently retired from the University of Queensland, Australia, and is a consultant with CTF Solutions; phone/fax 61-73378-5249, jeff@ctfsolutions.com.au.

Inside ASABE

NEWS ABOUT THE SOCIETY AND ITS MEMBERS

Discussion Roundtable on Student-Design Experiences Held at AETC

16

A Word From the President

17 Our Profession — Engineering for the Necessities of Life

Who Pays for the Operation of Oz?

18 The final of four articles on coordinating the AIM

Member Profile

19 Nothing Typical About This College Sophomore

Arizona Student Chapter Tours Tomato Greenhouses

20

Foundation

20 Thank You

Young Professionals Community

22 Career Planning

Rimpson Joins HQ Staff

23

Member News

23 Patrick McGuire
Russell A. Persyn
Gerry D. Galinato

In Memoriam

24 Robert B. Fridley
Frank J. Humenik
Gordon R. Hjertaas

Cooperative Standards Program

24

Welcome New Members

25

Events Calendar

26

Standards Sessions a Big Hit at AETC

During the 2006 Agricultural Equipment Technology Conference (AETC) in Louisville, Ky., the ASABE Standards and Meetings Departments hosted two standards-related technical sessions. The first was a roundtable discussion on Tractor-Implement Interface and Power Take-Off (TII-PTO); the second was an update on the ISO 4254 series of standards on safety. Both sessions were extremely well-attended and generated excellent dialogue among both presenters and attendees.



Two standards sessions held during the recent AETC in Louisville, Ky., were well attended by conference attendees.

More than 60 people attended the TII-PTO session coordinated by Rich Job of Richard W. Job & Associates. The session featured key topics provided by several acknowledged industry experts. Topics included safety, global markets and standards, ISO 11783 (electronic communications protocol standard), and large towed-equipment issues (hitching, braking, steering, stability). ASABE would like to thank Job, Doug Durant, Ed Kreis, Bob Benneweis, Tom Tuttle, and Brian Herbst for providing and presenting material for this roundtable. A special thank you to the Association of Equipment Manufacturers for providing refreshments for the session.

The discussion for the ISO 4254 series of safety standards was hosted by Mike Senneff, Deere & Co., and was also attended by more than 60 people. Senneff presented information on several areas within the series of standards, including current standards, standards about to be published, and ongoing work. He also covered the roles of ASABE, the International Organization for Standardization (ISO), and the European Committee for Standardization (CEN), particularly involving the 4254 series, in the international standards arena. A profound thank you goes out to Senneff for his presentation and material for this session.

Both sessions were well-received, especially since standards topics are typically considered a little bland. Attendees included a mix of academia, government, and industry — tractor, implement, and electronics manufacturers both large and small, including representatives from several companies exhibiting at the National Farm Machinery Show, held that week in Louisville.

There are plans to continue this type of material presentation, where and when appropriate. If you have a topic that would be served well by a roundtable or similar type of discussion at an ASABE meeting or conference, please contact Standards Director Scott Cedarquist, cedarq@asabe.org, or Meetings Director Mike Chesser, chesser@asabe.org for more information.

Travis Tsunemori, Technical Services Support Engineer

Discussion Roundtable on Student-Design Experiences Held at AETC

Design is a process; teaching design is a process. Whenever there is a process, there is opportunity for improvement. A panel/audience discussion roundtable on student design and corporate integration was held recently at the Agricultural Equipment Technology Conference. Discussion key points are summarized here for the benefit of ASABE members.

Each of the following panelists was asked by session moderator Dennis Buckmaster to identify aspects of a perfectly suited project.

Matthew Darr, The Ohio State University. Ideal design projects are well defined. The project scope needs to be achievable in the time frame of the senior design course scheduling. Teams of three to four students seem ideal. Good projects require a company liaison who is accessible regarding constraints and goals of the project. The sponsoring company needs to have a desire to see the project through and may need to provide funding for a prototype or testing.

Tim Osterhaus, Kuhn Knight. The time frame is critical. Projects need to be broken into steps so the student effort can lead to some sort of closure. Industry sometimes has trouble identifying product design projects with suitable timelines and scope. Projects related to test machines and equipment would be valuable to industry and help broaden the scope of projects. Projects which students may not be able to complete can still be valuable if they are suitably managed to defined endpoints. Project management is a valuable lesson complementing the technical effort.

Brian Olander, AGCO Corp. The project needs to be simple enough for students to understand and solve, yet challenging enough to help them grow. Students need to be able to bring projects to a level of finality to gain satisfaction. Although there will be industry involvement, the professor must be giving direction. Aspects of liability and

intellectual property should be understood and agreed upon by all parties.

Tony Kajewski, Deere & Company. Project size and scope needs to match group size and time frame. Timing needs to match the student's schedule and industry's desire for project completion. Projects could be related to manufacturing, product improvement, or testing and evaluation. Students need to have ownership of the project by choosing from a menu generated by faculty and industry sponsors. An ideal project will have multi-disciplinary aspects.

Alan Hansen, University of Illinois. Good projects are open ended, yet well-defined. Providing students with meaningful, real-world problems that industry



Panelists are (l to r) Tim Osterhaus, Alan Hansen, Dennis Buckmaster, Tony Kajewski, and Brian Olander. Matthew Darr is not pictured.

may take to production is both motivating and practical. Strong industry involvement is necessary and may be accomplished via teleconferences. Good projects will require students to use tools in their engineering toolbox (finite element analysis, budgeting, project management, etc.) to work towards a solution. Using state-of-the-art design and analysis tools can be an advantage to getting students involved. Practicing and perfecting communication skills are valuable aspects of a good project and could culminate with a final presentation. Projects requiring teamwork are reflective of real-world situations than individual projects and are preferred.

Audience Comments

- Multi-discipline projects may be more suitable to address problems posed by industry. Students learn to communicate to a wider array of perspectives while at the same time being introduced to other career paths.

- All real-world projects have a timeline. Milestones keep students on track.

- The company must be open to student ideas. Students are frustrated and feel unappreciated when their creative solution is discounted because it was "not invented here." Constraints should be defined first so students have a guide.

- Four person teams are ideal. Team effort is reflective of industry work and prepares students for a productive career.

- Capstone experiences do not necessarily have to revolve around design; they could focus on how to get something done in industry.

- Student-felt "failure" is not necessarily failure.

- Some senior design project results are the "next steps."

- Competencies such as oral presentations, written communication, project management, and leadership and teamwork skills are critical to success in industry and should be graded.

- Faculty are encouraged to search for projects beyond the major companies and traditional agriculture. Opportunities to

help industry are often greater with small companies with small engineering departments. Good projects cover the breadth of alumni placement.

- Matching student team members to a project involves the project topic, student interests, student capability, student choices of teammates, and class size. Teams should be balanced by experience and capability with faculty having an important role in team formation.

- Outcomes assessment needs to include individual understanding, project results, and team effort. Industry liaison input should be included. The evaluation is valuable to the student if it is delivered as constructive criticism as well as an evaluative summary. Delineating differences between project outcome and the learning process can be difficult but the goal of "best graduates we can generate" should be kept front and center.

Dennis Buckmaster, Penn State

A WORD FROM THE PRESIDENT

Our Profession — Engineering for the Necessities of Life

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



“Tell me in 20 words or less, what is it exactly that you agricultural and biological engineers do?”

How many times have we been asked that question, and how many times did we answer in a manner that didn’t include some type of comparison with another engineering discipline leaving us less than satisfied with our reply? And, if we can’t differentiate the role of our profession in

the engineering market place, then how can we expect the public to see how we are relevant, dare I say essential, to their prosperity and well-being?

With concern about our apparent lack of an easily articulated and comprehensive professional identity, I set out on a personal quest last July to identify the elemental words that describe our profession. But, as it turned out, I ended up with something else, better and more complete I think, but you’ll have to be the judge.

It all began with my asking ASABE members in numerous settings to give me the elemental words that they believed describe the:

1. Science/Methods/Technical base that does/should/will underpin and differentiate our engineering profession.
2. Products that our employers do/will/should produce.
3. Core values that describe our philosophical perspective.

The good news and bad news was that I collected hundreds of words from hundreds of people! What did they all mean? Finally, it came to me.

These words may be grouped together as part of the following unifying core concept: *Our profession provides engineering for the necessities of life.*

The words in this unifying core concept have major implications.

Profession refers to agricultural/biological engineering without mentioning the perceived differences.

Engineering infers that certain types of products are being produced according to some type of efficient and effective (productive) process.

Necessities infer that these products are required (essential)

for sustainability of life with physical human life being inferred, and *sustainability* requires environmental health for a substantial part of the plant and animal kingdom (ecosystem) as well.

I concluded that the products that compose the necessities for sustaining life may be placed in one of the following three categories:

- Human consumables (food, water, fiber, fuel, etc. directly/indirectly for humans, typically short-term)
- Process productivity (via tools, mechanisms, devices, implements, expertise, methodology, technologies, systems, etc. needed to produce the other two product categories, typically intermediate-term)
- Environmental health (sustainable, resilient, secure, safe, productive, comprehensive, integrated, etc., typically long term)

Furthermore, the short-, intermediate-, and long-term nature of these “products” serve to define the core values of our profession. It says to the public that our

engineering expertise is of “life-long” importance because our profession is relevant to humankind’s existence in every time frame.

So, what kind of tag line could we use in marketing our profession? I suggest: *Engineering for the necessities of life.*

Another attractive suggestion was: *Designing life-sustaining solutions today for sustainable living tomorrow*, and I’m sure that there are others that feed off the *Engineering for the necessities of life* theme.

So, at the end of my quest I found an answer to those who say, “Tell me in 20 words or less, what is it exactly that you agricultural and biological engineers do?” If I believe that they need to be aware of our profession’s complete unifying core concept, I reply confidently and with considerable pride:

Our profession provides the engineering for life-sustaining necessities associated with human consumables, process productivity, and environmental health.

And if I believe that a more succinct reply is in order, I simply say:

Our profession provides engineering for the necessities of life.

I welcome your thoughts, ideas, or concerns about your Society. E-mail them to OttoLoewer@asabe.org.

Our profession provides the
engineering for life-sustaining
necessities associated with human
consumables, process productivity,
and environmental health.

Who Pays for the Operation of Oz?

The final of four articles on coordinating the Annual International Meeting



Do your low registration fees provide for the future or just take care of the present? To dispel any myths – **you**, the meeting attendee, pay for the hard operational costs of the Annual International Meeting (AIM). These costs are not covered by sponsors or underwritten by grants. There are no alliances coordinated through the support of corporations to help reduce costs through trades of products or services. Most importantly, meetings and conferences **does not** receive any percentage of your member dues. Each meeting or conference begins with **zero** monetary support from any member.

Registration fees are the sole support for the AIM. Meeting and conference registrations are heavily relied upon by the Board of Trustees for growth of ASABE and member services. This non-dues revenue is important for the development of new meetings and conferences but also critical to the Society and its present services and the growth of future services for the membership.

Previous articles have discussed negotiating hotel rates based on the number of rooms guaranteed in a rooming block and members staying within that block, and negotiating rates for special service providers. This article strives to help you understand the true costs associated with the AIM.

Beginning with \$0, ASABE's Meetings and Conferences borrows against the Society and negotiates credit with service providers until the project is completed, and/or until the program generates revenue to begin reimbursing ASABE or paying invoices. Some of the expenses for the AIM are shown at right. Many costs are omitted due to space and the depth needed for explanation. There are tremendous expenses that the Meetings Department tries to cover in a first-class manner and for a nominal registration fee. In some registration classes it is a struggle to cover the minimum costs. This is where expectations of members don't necessarily meet the costs of the event. ASABE has found it necessary to charge fees for activities such as the Friends and Family Night, technical and cultural tours, continuing professional development seminars, and special receptions. We would like to provide these activities at no cost, but it is financially impossible. The next time you question the cost of the meeting registration, remember the expenses associated with it, whether you participate or not, and more importantly, ASABE's ability to provide for the future of the membership.

Mike Chesser, Director Meetings and Conferences

Meetings Fixed Expenses

- Printing (call for papers, programs, set-up, labor)
- Graphics design (programs, signage, and labor)
- Mailing labels (shipping, paper)
- Postage (U.S. postal service, UPS, special services etc.)
- Mail house services (sort and mail bulk mailings, labor)
- General expenses (insurance, committee meetings, committee meeting room charges, committee meeting audio visual, photography, decorations, drayage, union labor, tickets, speaker gifts, local host T-shirts, tour buses, advertising, publicity, signs, and gratuity)
- Supplies (pens, paper, registration and confirmation packets, name badge stock, attendee lists, Xeroxing, computers, printers, electrical, plug in to electrical, strike charges)
- Registration and security (general facility security, specialty security, evening fire watch, facility greeters, etc.)
- Audio visual (equipment, labor, internet service, electrical, strike charges)
- Telephone service (equipment, lines, per call fees)
- Speakers (complimentary registration, travel or assistance, housing, all meals, honorariums, etc.)
- Internal ASABE fees [for banking and related charges, staff salaries, overhead (office storage), and fixed expenses (office space and equipment rental)]
- Exhibit hall (pipe and drape, carpet, signage, entry towers, registration, membership booth, standards booth, publications booth, Board of Trustees booth, poster session, staging, audio visual, tables and chairs.
- Technical tours (tour admission, transportation, meals/snack, guides)
- Meeting proceedings (CD-ROM, errata, printed papers, shipping)
- Spouse/Guest gifts (plus shipping, screen printing, art charges)
- Meeting coffee breaks (regular and decaf coffee, assorted tea and hot water, lemonade, any breakfast bread on a per person rate, labor, applicable taxes and service charges)
- Friends and Family Barbeque (space, food and beverage, dessert per person charge, decorations, labor, applicable taxes and service charges)
- Awards luncheon (space, food and beverage, dessert per person charge, labor, applicable taxes and service charges, audio visual, staging, decorations, security, signage, and awards)
- Spouse/Guest tea (tea, coffees, dessert on a per person rate, signage, guest speaker, labor, applicable taxes and service charges, tables, chairs, and linen)
- Spouse/Guest luncheon (meal, beverages, labor, applicable taxes and service charges, entertainment/speaker, audio visual, decorations, signage)
- Spouse/Guest lounge (regular and decaf coffee, assorted tea and hot water, lemonade, any breakfast bread on a per person rate, signage, decorations, tables, chairs, linens, labor, applicable taxes and service charges)
- Fellows induction ceremony/reception (space, food and beverage, dessert per person charge, labor, taxes and service charges, audio visual, staging, decorations, security, signage, and awards)
- International/New/Student receptions (space, labor, applicable taxes and service charges, audio visual, staging, decorations, security, signage, and awards)
- President's reception (space, food and beverage consumption, dessert per person charge, labor, taxes and service charges, audio visual, staging, decorations, security, signage, and awards)
- Reception (space, food and beverage, dessert per person charge, labor, applicable taxes and service charges, audio visual, staging, decorations, security, signage, and awards)
- University receptions, breakfasts, luncheons. ASABE bills each for the cost of goods or services associated with the individual event.

Meetings Variable Expenses

- Convention Center (room and ballroom rental, bulk exhibit space rental, security, housekeeping, labor, electrical technicians, building engineers, lights, other electrical needs, etc.)
- Continuing professional development seminars (speakers honorarium, complimentary registration, room rental, audio visual, handouts, meals, housing, etc.)

MEMBER PROFILE

Nothing Typical About This College Sophomore

Hans Anderson isn't your typical college sophomore. In fact, there is nothing typical about him. Since he was about 19 months old, he has been fascinated with electronics.

"When I was very young, I remember working with batteries and lights," says Anderson. "I also understood it was dangerous to put my finger in the socket," he adds laughingly.

That early interest led him to the Massachusetts Institute of Technology (MIT) where he is majoring in electrical engineering computer science with a special interest in ag engineering. What is extraordinary is that Anderson is only 16 years old!

When not away at college, Anderson lives in Evergreen, Colo., with his father, a meteorologist who majored in agricultural engineering; his mother, a doctor; and his 12-year-old brother.

Anderson's passion is robotics, specifically agricultural robotics. At 14, he designed an agricultural robot harvester that is capable of planting and harvesting. He says he doesn't always know the reasoning behind the projects that he works on.

"I can look at a picture of agricultural equipment from 3,000 years ago, find out what it did, and then think about how to modify it and attach it to a robot," says Anderson.

He perfected the design for the robotic harvester with almost no background. He says improvements can be made to the design now that he has a greater knowledge of agricultural engineering. He adds that the mechanical pieces were not as efficient as the methods commonly used today.

"I'm very interested in taking that project and rebuilding the robot with more modern technologies and tools and improve the proficiency of the performance," Anderson says.

He would love to find a mentor for an agricultural engineering project. He is seeking guidance on how to get into the agricultural field, understanding how



ASABE member Hans Anderson is a 16-year-old sophomore at the Massachusetts Institute of Technology. He is majoring in electrical engineering computer science and has a passion for agricultural robotics.

things are done, and what is on the cutting-edge of agricultural engineering.

Someday Anderson would like to start a business in agricultural robotics, not only because it interests him, but also because, he says, it would be beneficial to humans. With that in mind, he would like to make the world a better place by using engineering technology.

"Robotics could be extremely effective in places where agriculture is very labor intensive, as in third-world countries," says Anderson. "Perhaps they wouldn't have to spend all their time farming," he adds.

Anderson would like to see the majority of agriculture become robotic. "It would allow people greater freedom to do what they want," he says. But he admits there are benefits and drawbacks.

He feels that there could be a substantial improvement in how agriculture is done in other countries and robotics could also help solve environmental problems and poor agricultural practices. But Anderson has concerns about robotic technology displacing too many people from the work force and not providing enough opportunities. He wonders whether it is good that engineering has the potential to take the forefront over labor. That humanistic aspect is a very important concern to Anderson.

This leads to another one of Anderson's passions: politics. He is very interested in foreign policy and is minor-ing in Russian Studies. He became interested in the Russian language as a student in elementary school where he was required to take Russian for a semester. He is still able to speak some of the language and had the opportunity to visit the country a few years ago. He is currently active in student government at MIT and is a student senate representative. He says he wouldn't rule out running for president in the student government.

Anderson is currently pursuing a five-year master's degree program. Graduate school is definitely in his future with Harvard being a possibility.

He credits his parents with being excellent role models. "They paid attention and focused on what needed to be done. They are positive, well-rounded parents, and provided lots of opportunities for different activities," he says.

Those activities included playing football, violin, guitar, computer games; making amateur films; writing; and being a member of the Civil Air Patrol. He is currently working on a private pilot's license.

Anderson has also taken the time to tutor Native Americans and to design a program for children about robotics, including the mechanical and electrical aspects.

"I am trying to interest people in robotics in the same way I am," he says.

Once he graduates and his future agricultural robotics business is stabilized, Anderson says he would like to enter the political scene.

"I'd like to help the country move to a bigger focus on engineering," he says. "Public service is very important."

Using agricultural robotics to promote humanitarianism is a wonderful concept from this passionate future robotics engineer. The world is indeed fortunate to have Anderson in the ag engineering profession.

Arizona Student Chapter Tours Tomato Greenhouses

The University of Arizona chapter of ASABE recently attended a tour of the Eurofresh greenhouses in Willcox, Ariz. The tour concentrated on the site that grows Compare tomatoes. These tomatoes are smaller in size than the average giant tomato, but larger than the cherry tomato.

The greenhouse was filled with thousands of tomato vines draped along hooks connected to the ceiling. The vines stretched from the ceiling hooks to a height of a knee's length above the floor. All of the tomatoes in the greenhouse were about 10 months old, with rotations of new and old

plants, to allow for year-round tomato growth. Each vine was rooted in a mineral solution, which was constantly kept moist. Thus, no soil was necessary for the tomatoes to grow.

Along the ground, near the bottom of the vines, were heating coils that maintained the temperature inside the greenhouse. The tour guide also pointed out that another method of temperature control within the greenhouse was the opening and closing of the glass panes that lined the roof. Other factors affecting the environment within the greenhouse were humidity and the population of trained bees that were used to pollinate the plants. All these controllable environmental factors were regulated by a large switchboard located outside the greenhouse entry doors. This was an efficient means of environmental management because as soon as a change was needed, the grower could make

the adjustment, rather than having to control the conditions from an office located off site. The tomatoes were also resistant to certain pathogens through uptake of certain chemical compounds that inhibited growth of the pathogens.



Shown (l to r) are agricultural and biological engineering undergraduates: Stephanie Sara, Priyanca Sarkar, Diana DeRosa, Justina Tam, and Danny Luna.

Along with a tour of the greenhouse, the group also observed where the packaging of the tomatoes occurred. This packaging involved taking a crate of picked tomatoes, neatly placing labels on the tomatoes, and packaging the tomato clusters into a carton. Each cluster consisted of six tomatoes, a genetic manipulation,

which allowed for an efficient method of packaging the tomatoes into six-tomato cartons. While touring the packaging area, the group learned a surprising fact about the Eurofresh sticker. Each Eurofresh label is hand placed on each tomato to comply with the customer's shelving preference.

The customers of Eurofresh tomatoes include Costco, Sam's Club, and many other grocery stores. Approximately 8,000 tomatoes are picked daily and sent to these stores for consumer purchase.

Each club member was given a bag of cherry tomatoes to take home, along with the knowledge of how much manual labor, organization, machinery, and care was involved in each tomato bag.

Justina Tam, President, ASABE Student Chapter

FOUNDATION

Thank You

The generous support and contributions of the following members from March 2005 through February 2006 is appreciated. A special thank you to those who donated or arranged to have items donated for the 2005 Silent Auction in Tampa.

100th Anniversary Fund - Henry A. Affeldt, Robert A. Aldrich, William Harold Allen, Carroll R. Amerman, Bruce R. Anderson, Leslie F. Backer, O'Gene W. Barkemeyer, Page L. Bellinger, James F. Bennett, Albert M. Best, Walter K. Bilanski, Gary A. Bishop, Louis F. and Leatrice Bouse, Francis Brinkmeyer, Robert H. Brock, Adriana C. Bruggeman, Michael F. Brugger, Gary D. Bubenzer, Kerry R. Buchinger, Edward J. Campbell, Craig W. Cannon, Elvin L. Carlson, Ralph P. Cavaliere, An-Pan Cherng, Yves Choiniere, R. Nolan Clark, Florentino T. Conde, James Robert Cooke, J. Reese and Terri Coulter, R. Bruce Curry, Donald L. Day, Harold E. de Buhr, Sherwood S. DeForest, Kelly A. Detra, Elbert C. and Peggy Dickey, James P. Doering, James H. Dooley, Carroll J.W. and Arlene Drablos, Mae

Grant Duke, Unus F. Earp, Ronald L. Elliott, Lowell J. Endahl, Cady R. Engler, Robert O. Evans, Paul N. Extrom, Antonio Finassi, Clifford A. Flood Jr., Jane Frankenberger, Theodor Friedrich, Dale Ebenhard Gandrud, Richard S. Gates, Lawrence H. Gay, John A. George, Carroll E. Goering, John R. Goss, James A. and Velma Graham, Robert E. Graves, Kenneth J. Guffy, Robert J. and Yvonne Gustafson, G. Leroy Hahn, James L. Halderson, Carl W. Hall, William D. Hanford, Roy E. Harrington, Samuel A. Hart, James G. Hartsock, David L. Heckman, Dale F. Heermann, Bill Heffernan, Kenneth J. Hellevang, S. Milton Henderson, Floyd L. Herum, Glen H. Hetzel, Edwin A. Heys, Edward A. and Pat Hiler, Gordon R. Hjertaas, Joseph P. Hollingsworth, Gale A. and Donna Holloway, Brian J. Holmes, Terry A. Howell, Walter E. Hull, Gerald W. and Phyllis Isaacs, Randy Y. Ishii, Sonia M.M. Jacobsen, Kevin A. Janni, Gail E. and Janice Janssen, James K. Jensen, Richard W. Job, Stanley W. Joehlin, Clarence E. Johnson, Curtis A. Johnson, Kevin G. Johnson, William H. and Wy Johnson, James W. and Jean Jones, Benjamin A. and Georgeann Jones Jr., Don H. Kampbell, Prasert Kanoksing, Jack Keller, Ernest H. Kidder, Laurence Kimura, Dale E. Kirk, Cernyw K. Kline, Richard and Jane Koelsch,

FOUNDATION

John J. Kolega, Paul K. Koluvek, George J. and Rhoda Kriz, E. Gordon Kruse, Donald E. Kuska, Benson J. Lamp, Robert C. Lanphier III, Dirk E. and Heidi Maier, Deane M. Manbeck, Harvey B. Manbeck, Harry L. Manges, Derrel L. and Joan Martin, W. Gerald Matlock, Ronald and Sandra McAllister, Andrew W. McBride, Donald K. McCool, Galen M. McMaster, Stewart W. and Carol Melvin, Gustavo Morales, Leland E. Morgan, Scott Mueller, Kurt Nathan, John L. Nieber, John R. Ogilvie, John F. Ourada, Robert M. Peart, Roscoe L. Pershing, Donald H. Pettengill, Leroy K. Pickett, James H. Polacek, Jay G. Porterfield, Hoyle B. Puckett, Neil L. Rambo, Steven Alan Reed, Randall C. Reeder, Clarence W. Richardson, Allen R. Rider, William N. Riggs, Wayne L. Robison, Paul H. Rofkar, C. Alan Rotz, George L. Russell, William R. Schnug, Stephen Wayne Searcy, Larry J. and Donna Segerlind, Terry J. Siebenmorgen, Richard Wayne and Judy Skaggs, Sherwood D. Skinner, Lawrence H. Skromme, Walter H. Soehne, William E. Splinter, James M. Stanley, Lyle E. Stephens, Richard R. Stowell, Brian and Catherine Strobel, Richard L. Stroschine, Kenneth A. Sudduth, Charles E. and Mary Sukup, Donaldson S. Taylor, Arthur A. Teixeira, E. Dale Threadgill, Ernest W. and Caren Tollner, Larry W. Turner, Edward G. Tuttle, Basil R. Twist, Omar Ulloa, Kenneth L. Von Bargen, John N. Walker, Thomas R. Way, Harold T. Wiedemann, Thomas H. Williams, Bruce D. Wilson, Kenneth C. Wolfgram, Arthur Zaltzman, and Puerto Rico Section.

A.W. Farrall Young Educator Award Fund - Jaw-Kai Wang.

Cooperative Standards Fund - Richard T. Bennett, Scott C. Cedarquist, Kelly A. Detra, Robert J. and Yvonne Gustafson, James G. Hartsock, Edwin A. Heys, Andrew A. Keller, Kenneth L. McFate, Herbert D. Sullivan, Travis and Doris Unterzuber, Linus R. Walton, Daniel L. Wambecke, and Jerry L. Wille.

Dale F. Heermann Award Fund - John and Betty Addink, John Andrews, Craig and Mary Brodahl, Wayne Clyma, William and Sandra Condon, Manis Edwards, Dean and Maria Eisenhower, Douglas and Lucille Evans, Norman and Jean Evans, Judith Flynn, James and Judith Fouss, Duane and Sharon Foxhoven, James and Karen Gilley, Howard and Julia Haise, David and Barbara Hawes, Dale F. Heermann, James and Ruby Hindley, Linda Holmquist, Harold and Loma Howard, Marvin and Doris Jensen, Leslie and Harriett Jochens, Thomas H. Kimmell, Dennis and Martha Kincaid, Norman L. Klocke, Wayne and Ruth Koenig, Gordon and Edith Kruse, Freddie and Donna Lamm, Derrel L. and Joan Martin, Arthur and Marian Meyer, Hulda and Lawrence Meyer, James and Ramona Mueller, Meredith and Winnette Payne, Len Ring, Gerald Schuman, LaVerne and Shirley Stetson, Todd and Mitzi Trooien, Louise Tuchenhausen, Dolores Underhill, Jan and Roberta Van Schilfgaarde, Robert D. and Judy von Bernuth, Curtis L. and Nancy Weller, Richard and Jane Wenstrom, Loren and Sharon Wiesner, Lori Wiles, Dick and Susan Wolfe, and David and Kathryn Woolhiser.

Dale Wm. Zimmerman P.E. Fund - Curtis L. Weller and Dale Wm. Zimmerman.

Electronic Publishing Legacy Fund - Billy J. Barfield, Carl J. Bern, Loren E. Bode, Arend-Jan Both, Claude E. Brown, Robert M. Butler, Clifford A. Flood Jr., Robert S. Freeland, Terry A. Howell, Andrew A. Keller, Stewart W. and Carol Melvin, R. Vance Morey, David W. Smith, Lyle E. Stephens, Jodie D. and Joyce Whitney, Luther R. Wilhelm, and Roy E. Young.

Engineering Education Fund - Eldridge R. Collins Jr., Claude James Phene, and Ernest W. Tollner.

Engineering Research Fund - Ernest H. Kidder and Claude James Phene.

Evelyn Rosentreter Endowment Fund - Page L. Bellinger, William A. Cooke, and Evelyn E. Rosentreter.

Fellows Fund - Douglas L. and Patricia Bosworth, Robert O. Evans, James K. Koelliker, Robert C. Lanphier III, Derrel L. and Joan Martin, Stewart W. and Carol Melvin, John C. Sager, and Keith E. Saxton.

Foundation Scholarship Fund - James W. Bloomer II, Claude E. Brown, Larry C. Brown, Antonio F. Carrillo Baila, Ralph W. Hanson, Wiley H. Henson, Andrew A. Keller, William L. Kjelgaard, Arturo Mendoza-Morales, Felipe Montes, Balaji Narasimhan, Jay G. Porterfield, and Walter Joyner Rawls.

Foundation Technology/Mechanization Fund - William L. Kjelgaard.

Future Fund - David B. Beasley, Douglas L. Bosworth, Do Sup and Okky Chung, Gary A. Clark, Harry H. Converse, Donald C. Erbach, Robert D. Fox, Richard O. Hegg, Robert G. Holmes, Terry A. Howell Jr., Roger M. Hoy, Gerald W. and Phyllis Isaacs, Kevin A. Janni, Paul J. Jasa, Larry R. Johnson, William H. and Wy Johnson, George J. and Rhoda Kriz, Benson J. and Jane Lamp, Walter D. Lembke, Otto J. and Betty Loewer, Stewart W. and Carol Melvin, David B. Palmer, Fred A. Payne, Robert M. and Virginia Peart, Larry J. and Donna Segerlind, Ted H. Short, Lyle E. Stephens, and Travis and Doris Unterzuber.

General Fund - Robert L. Burris, Kelly A. Detra, Bruce R. Hartsough, E. Paul Jacobson, and Allen R. Rider.

Graduate Student Research Award - Norman R. Scott.

International Development Fund - LaVern W. Faidley.

John L. and Sarah G. Merriam Scholarship Fund - John L. Merriam.

Larry and Lola Huggins Fund - Larry F. and Lola Huggins.

Nolan Mitchell Young Extension Service Award - Dirk E. and Heidi Maier.

Preprofessional Fund - Gary A. Clark and Ajit K. Srivastava.

Price Hobgood Fund - Buddy W. Teague.

Public Issues Fund - Eldridge R. Collins Jr., David B. Palmer, and Claude James Phene.

Russell H. Hahn Fund - L. Dale and Donna Baker, Vince F. Bralts, Russell H. Hahn, Roger M. Hoy, Benson J. and Jane Lamp, Ronald and Sandra McAllister, Leroy K. Pickett, LaVerne E. Stetson, and Curtis L. and Nancy Weller.

Student Engineer of the Year Award - Linda Holmquist, John W. Hummel, and Norman L. Klocke.

William J. and Marijane Adams Scholarship Fund - William J. Adams and Donald D. Rastorfer.

Young Professionals Community Fund - Larry J. and Donna Segerlind.

YOUNG PROFESSIONALS COMMUNITY

Career Planning

Dear Young Professional:

We are pleased to extend a formal offer for your employment as an engineer.

— Compensation Director

This invitation for gainful employment is the culmination of a young professional's existence to this point. Maybe your interest as an engineer began with the smell of the home farm, seeing that colored tractor in a parade, wondering how that white stuff really gets into Twinkies, or maybe you just wanted to grow cilantro on Mars. No matter where your interest began, your career may take you any number of directions. Career planning will help you choose the path of your career, and, if done properly, will take you on a rewarding journey. The following ideas may help you get from the stuffy interview room to the comfortable rocking chair of retirement.

Career Path

Will you become a CEO, or do you prefer to design the latest breaking technology? This is a question you may need to be prepared to answer some day. Do you want to manage co-workers, or would you prefer to run lab experiments? The answer to this question may determine your personal career goals. Keep in mind that not everyone becomes a CEO or department head, nor do you typically get to choose. Early career experiences and opportunities can set the stage for your career. If you turn down a certain position you may have just turned down your CEO bonus. As opportunities are presented, keep a positive attitude and keep in mind that you were given the task for a reason.

Career Interests

If you have not had a chance to intern or gain experience in your area of employment, you should find out what you want to do in five or even 10 years. Most large companies rotate young engineers into different roles to determine what the employee enjoys and where that employee will fit in the company. This opportunity may get your head spinning, but it offers the chance to explore your likes and dislikes. If you do not have the opportunity to rotate positions, try informational interviewing. Find a colleague that works in an area of your interest and arrange an interview to discuss the various aspects of their work. The interview can help determine if this is a path for you and may eventually turn into an employment opportunity for you.

Attitude

Do you enjoy your job? If you do not, you need to determine why. There may be times when you are given a job (or so called "opportunity") that you wish did not exist. You may have been put in this position to gain experience or to see your response to the challenge. Every opportunity has something to

teach you. Be open minded with new assignments and see what you can take away to make it a great opportunity. If you feel that your assignment is not leading your career in the right direction, talk to your boss. A career plan makes it possible to have a constructive conversation about your goals instead of just complaining to your boss about your current assignment. Your boss may even help your path or suggest some revisions based off their experience.

Networking

Take the first step – ASABE membership. ASABE meetings at all levels are great networking opportunities. Meetings are your chance to talk to multiple people outside of the work environment about your interests. Professional Society gatherings give you a large sample of professionals in your interest area. When attending the next section meeting, Annual International Meeting (AIM), or a specialty conference, try to meet at least one new person in your area of interest. You may meet your next brainstorming partner or your future employer.

Another great networking opportunity is the ASABE mentoring program. Choosing a mentor gives you one great contact along with their entire network.

ASABE also offers special communities such as the Young Professional Community (YPC). YPC is a group of young engineers who may know what you are experiencing. The YPC was formed to help recent graduates get to the next step in their career. This group also knows how to blow off steam at the end of the day. At your next meeting look for any YPC activities and see how we can help your future.

Training

Now that you have a career path and plan in place, you need the tools to get there. Maybe you need a graduate degree as discussed in the November 2005 *Resource* YPC section. Will you need a license as mentioned in the March YPC article? There are many opportunities for continuing education, both traditionally and via distance-learning programs, that you can take. With all the different offerings, you will need to determine if you will pursue an advanced engineering degree or maybe a law or business degree. If you are working at a university or for the government, do you need industry experience? This is great opportunity to use your network of contacts to get the experience you need. If you do not like the idea of having homework again, an ASABE continuing professional development (CPD) course could help. The YPC is offering a series of CPDs at ASABE sponsored meetings that are intended to increase the tools in your engineering toolbox. For more information, please see the programs for specialty conferences and the AIM.

Andrew C. Easter
YPC Standards Council Representative

MEMBER NEWS

Rimpson Joins HQ Staff

Cassandra Rimpson was recently hired to fill the position of Meetings Coordinator at ASABE headquarters. She will be involved in the planning and structure of



the Annual International Meeting as well as upcoming conferences.

Rimpson received her associate's degree from Lake Michigan College in liberal arts, and a bachelor's degree in political science from the University of Michigan. Her association experience includes work with the Indiana State Bar Association.

She and her husband are the parents of two boys, ages two and five months.

Rimpson likes to stay busy, and her new position ensures that she will have plenty to do. She says she is becoming quite an expert at multi-tasking.

Members will get a chance to meet Rimpson at the meeting in Portland.

"I'm looking forward to my first Annual International Meeting and getting to know all the people I have been working with on the phone and the Internet," she says.

Rimpson can be reached at 269-429-0300, ext. 303, rimpson@asabe.org.

Patrick McGuire, P.E., chief engineer for Borkholder Buildings in Napanee, Ind., recently received the Bernon Perkins Award from The National Frame Builders Association (NFBA).



The Bernon Perkins Award is NFBA's highest honor. It is presented each year to an individual giving exemplary service to the post-frame industry.

As a chair of the NFBA Technical and Research Committee, McGuire has spearheaded important breakthroughs for the post-frame industry. He united industry factions that were often at odds to push for new technical research projects that safeguard the continued growth of the post-frame industry.

His vision led the way for acceptance of post-frame design in the International Building Code. He identified the urgent problem created when ring-shank "pole-barn nails" were deleted from the National Design Standard, and coordinated efforts to create a new ASTM Standard, F1667, for ring shank nails under the new title of *Post-Frame Nails*. He has been a member of ASABE for 15 years.

Russell A. Persyn, P.E., was recently hired as the environmental quality engineer for the South Dakota State University (SDSU) Cooperative Extension Service.



In this position, he will work directly with ag producers and other residents of the state on water resource and water quality issues, including nutrient management, erosion

control, and waste management. Persyn will lead SDSU's involvement in the environmental training program for operators of concentrated animal feeding operations.

Persyn also is an assistant professor in SDSU's Department of Agricultural and Biosystems Engineering. He received his bachelor's and master's degrees in agricultural engineering from Texas A&M University. He earned his Ph.D. with separate majors in agricultural engineering and civil engineering from Iowa State University. He has been a member of ASABE for 12 years.

Gerry D. Galinato, P.E., principal energy specialist of the Idaho



Department of Water Resources, Energy Division, Boise, Idaho, was recently honored with the 2006 Gintong Butil (Golden Grain) Award for Professional

Achievement by the Central Luzon State University (CLSU) Alumni Association. The award is the highest recognition bestowed on alumni who have excelled and created significant impact in their chosen fields.

In addition, he received the 2006 Outstanding Engineering Alumni Achiever Award presented by the CLSU College of Engineering. The award is given to alumni who have distinguished themselves in their profession and field of expertise thereby bringing honor and prestige to CLSU and the College of Engineering in particular.

Gilانات received his bachelor's degree from the Central Luzon State University, the Philippines, in 1967, and a master's degree at the University of Idaho, Moscow. Both degrees are in agricultural engineering. He has been a member of the ASABE for 37 years.

IN MEMORIAM

ASABE Fellow Robert B.

Fridley, 71, died March 19, 2006. A former ASABE president, Fridley was professor emeritus and former department chair from 1974 to 1976 of the Biological and Agricultural Engineering



Department at the University of California (UC), Davis.

Fridley also directed the Aquaculture and Fisheries Program at UC Davis and served as executive associate dean for the College of Agricultural and Environmental Sciences. In addition, he conducted forest engineering research with Weyerhaeuser Company. He chaired the Project 2000 Strategic Planning Steering Committee for the College of Agriculture and Environmental Sciences at UC Davis and was appointed executive assistant dean in 1989. He retired in 1994 but served as a special assistant through 2000. Fridley's research supported industry needs in agriculture, forestry, and aquaculture. He was instrumental in developing the tree harvester for mechanical harvesting of tree fruit.

A 50-year member of ASABE, Fridley was president of the Society from 1997-1998. He was elected an ASABE Fellow in 1978, and served on the Foundation Board of Trustees.

Fridley earned a bachelor's degree from UC Berkeley in 1956, a master's in agricultural engineering from UC Davis in 1960, and was appointed assistant professor at UC Davis in 1961. He was a visiting professor at Michigan State University (MSU) from 1970-71 where he was awarded a doctorate in 1973.

Survivors include his wife, Jean; his mother, Gladys Fridley; three sons: James of Seattle, Wash., Kenneth of Tuscaloosa, Ala., and Michael of Columbus, Miss.; and eight grandchildren. Memorials may be made to Yolo Hospice, 132 East St., Davis, CA, 95616.

ASABE Fellow Frank J.

Humenik, P.E., 68, of Raleigh, N.C., died March 28, 2006.



Humenik was a professor of biological and agricultural engineering and served as coordinator of the College of

Agriculture and Life Sciences, Waste Management Programs at North Carolina State University. He received his doctorate from The Ohio State University. He was named an ASABE Fellow in 1994 and had been a member of ASABE for 33 years.

Survivors include his wife, Sue; a daughter, Kerry Knoll of Apex, N.C.; a son, David of Patterson, N.Y.; and two grandchildren. Memorials may be made to Watchtower, 25 Columbia Heights, Brooklyn, N.Y., 11201-2483.

Gordon R. Hjertaas, 55, of

Fargo, N.D., an engineer with Phoenix International, died March 17, 2006.



Hjertaas, a native of Redvers, Saskatchewan, moved to Fargo in the early 1990s to work for Phoenix. He was an engineer-

ing graduate from the University of Saskatchewan and worked at various organizations including P.A.M.I. in Humboldt, Saskatchewan, and SED Systems in Saskatoon, Saskatchewan. Hjertaas spent the last several years as an electronics engineer for John Deere in Fargo. He was a 33-year member of ASABE.

Survivors include his parents, Ralph and Emelie Hjertaas of Prince Albert, Saskatchewan; and two brothers, David of Shellbrook, and Marty of Canmore, Alberta. Memorials may be made to Abbeyfield House Society, 190 26th St. E., Prince Albert, SK, Canada, S6V 1Z7.

Cooperative Standards Program

New Projects

X584.1, Agricultural Equipment: Speed Identification Symbol (SIS). This standard is being revised to make the dimensions of the SIS more practical and to enhance visual clarity.

X566.1, Guidelines for Selection of Energy Efficient Agricultural Ventilation Fans. This standard is being updated to reflect recent data from the University of Illinois Bioenvironmental Structural Systems (BESS) labs and other sources. These updates will increase the effectiveness of the standard by improving the scope of the efficiency rating process.

Withdrawal of ASAE S513, Agricultural Wheeled Tractors - Front Mounted Linkage and identical adoptions of ISO 8759-1, Agricultural wheeled tractors - Front-mounted equipment - Part 1: Power take-off and three-point linkage and ISO8759-2, Agricultural wheeled tractors - Front-mounted equipment - Part 2: Stationary equipment connection. This is another step towards international harmonization. Some content in ISO 8759-1 was originally based on ASAE S203 PTO and S217 3-pt linkage. ISO8759-2 was solely based on U.S. content.

Revisions

ANSI/ASAE S354.5, Safety for Farmstead Equipment. This revision updated the Normative References and added a section on Highway Travel.

ASAE S301.4, Front-End Agricultural Loader Ratings. This revision updated the Normative References.

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.

WELCOME NEW MEMBERS

ASABE welcomes the following new members who joined the Society, reinstated a lapsed membership, or upgraded to full membership from student/preprofessional membership in March. Where available, the member's place of employment has been provided. Please join us in extending a warm welcome to these new and returned members of our Society.

New Members for March

- Adeoye E. Adediji, University of Ibadan
 Temidayo T. Adekoya, University of Ibadan
 Oyelola O. Adekoyejo, University of Ibadan
 Jubilee Titobioluwa Adeoye, University of Ibadan
 Adedoyin A. Adesina, University of Ibadan
 Salaam Hafiz Afolabi, University of Ibadan
 Robert J. Akridge, HQ U.S. Air Force Reserve
 Oyewale A. Alagbe, Ladoke Akintola University of Technology
 Scott T. Albrecht, CNH
 Carlos J. Alvarez, University of Santiago de Compostela
 Jayendra Kumar Amamcharia, North Dakota State University
 Debra S. Anderson, Montgomery College
 Brian D. Ashman, University of Minnesota
 Olufemi Patrick Balogun, University of Ibadan
 Olabode Samuel Bankole, University of Ibadan
 Lise Beauchamp, Ferme M.g. Prowlx
 Maureen E. Beck, Caterpillar
 Eshetu Beshada, University of Manitoba
 Kenneth J. Bisceglia, Weston & Sampson Engineers Inc.
 Josephine M. Boac, Kansas State University
 Terrence T. Booyesen, Biodiesel One
 Jason R. Byler, EA Engineering
 Elmer D. Castillo, Department of Agriculture
 Hong Lim Choi, Seoul National University
 Katrina L. Christiansen, University of Nebraska
 Daniel E. Ciolkosz, University of Kwazulu-Natal School of BEEH
 Brian G. Copeland, Mississippi State University
 Michael J. Copeland, Royal Swaziland Sugar Corp.
 Cara A. Cowan Watts, Elected Cherokee Nation Tribal Council Woman
 Aaron D. Crenshaw, Fulghum, MacIndoe, and Associates
 Mark Crocker, University Of Kentucky
 Michael Czarick III, University of Georgia
 Rotimi Moses Davies, Faculty of Agriculture
 Eric D. Desmond, Ohio State University
 Temitayo A. Ewemoje, University of Ibadan
 Kyle F. Flynn, Montana Department of Environmental Quality
 Veronique Fontaine, Government of Quebec
 Paul L. Forton, Spicer Group Inc.
 Jesus M. Garcia-Robles, Centro de Investigacion En Alimentacion Y Desarrollo A.C.
 Dinesh Garg, OPI Systems Inc.
 Laura A. B. Giese, Wetlands Studies & Solutions Inc.
 Matthew L. Gillison, Gillison's Variety Fabrication Inc.
 Kerry J. Goforth, Burns & McDonnell
 Mark Gordon, Ontario Ministry of the Environment
 Tridib Kumar Goswami, I.I.T. Kharagpur
 Sasha D. Hafner, Cornell University
 Martin A. Hebel, Southern Illinois University
 Bernard J. Hershberger, C U Stoltzfus Mfg. Inc.
 Kaare Holm, Emerging Growth Enterprise
 Christopher N. Hood, University of Illinois
 Brian Hoover, Purdue University
 Md. Zakir Hossain, University of Idaho
 Harikishan Jayanthi
 Michael J. Kawleski, Wisconsin Public Service Corp.
 Andrew F. Knowles, FMC FoodTech
 Kadjo Samuel Alain Kouakou, Ministry of Agriculture
 Hsuan Hung Lai
 Renee Lamontagne, University Laval
 Olawale O. Lanade, University of Ibadan
 Jason P. Ley, Purdue University
 Timothy J. Lukavsky, Kraft Foods Inc.
 Brandon D. Mann, Caterpillar Inc.
 Adrian Martinez-Kawas, Kansas State University
 Abdul Matin, Bangladesh Agricultural Research Institute
 Timur B. Mikaya, AGCO Corp.
 Min Min, University of Florida
 Jacob L. Misch, Eaton Corp.
 Bijon K. Mitra, Iwate University
 Denis Mutibwa, University Of Nebraska-Lincoln
 Deputy Nanager, Mahindra and Mahindra Tractors
 Jose Wallace B. Nascimento, Federal University de Campina Grande
 Oluwasegun O. Ogunsanwo, University of Ibadan
 Hiroaki Okada, Sanyu Consultants Inc.
 Oluwalogbom D. Oluyemi, University of Ibadan
 Uba O. Onuoha, University of Ibadan
 José Ortiz, AgCert Mexico Servicios Ambientales S de R.L. de C.V.
 Agbelusi Oyedapo Oyebankole, University of Ibadan
 Babatunde O. Oyefeso, University of Ibadan
 Frederick W. Phillips, Clean Burn Inc.
 Paige R. Puckett, North Carolina State University
 Zhiming Qi, Iowa State University
 Stewart D. Reed, Oklahoma State University
 Fernando A. Rodriguez, Interaguas
 Dave V. Rotole, John Deere Ottumwa Works
 Joseph L. Rudolph, Merrill Equipment Co.
 Mohammed A. Salahat, Purdue University
 Erik Schilling, NCASI
 Ronald L. Sheedy, John Deere Harvester Works
 Tony S. Singh
 Thopali R. Srinivas, Jacques Whitford International Holdings Ltd.
 Benjamin J. Swart, John Deere C&CE Division
 Chris Teachout, Teachout Harvest
 Erin E. Thelen, USDA-NRCS
 Daniel Tomaski, Eastport Group Inc.
 Kenneth K. Ubom, University of Ibadan
 Mirwan Ushada, Osaka Prefecture University
 Sandeep Vageeshwara, IIIT-Bangalore
 Luis Val, Universitysidad Politecnica de Valencia
 Frik P. Van Rooyen, LGT Ltd.
 Tolu T. Vaughan, University of Ibadan
 Qi Wang, University of Illinois
 Wayne M. Wasylciw, Alberta Reserch Council
 Lin Wei, Mississippi State University
 Joel C. Werling, John Deere C&F
 Xiaorong Wu, Kansas State University
 Daukiye Samuel Zibokere, Niger Delta University
 Wilberforce Island

EVENTS CALENDAR

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

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.

Oct. 20-24 **11th National Symposium on Individual and Small Community Sewage Systems.** Warwick, Rhode Island, 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

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.

June 13 **Tennessee Section.** Agricultural Campus, The University of Tennessee, Knoxville, Tennessee, USA. Contact Wesley Wright, 865-974-7266, wright1@utk.edu.

July 16-19 **2006 National Technical Conference and Annual General Meeting of the CSBE/SCGAB.** Edmonton, Alberta, Canada. Contact www.bioeng.ca/Events/Edm2006/.

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

Oct. 11-12 **Texas Section.** Brenham, Texas, USA. Contact Catherine Nash, 254-742-9915, catherine.nash@one.usda.gov.

Personnel Service

POSITIONS OPEN

The deadline for copy to be received at ASABE is the first day of the month preceding the month of publication (July 1 for the August 2006 issue). Each issue mails on the first day of the month.

Beginning with the January/February 2006 issue, advertisements are \$125 per column (3.5-inch wide) inch, which includes free placement on ASABE's new Career Center Web page at www.asabe.org/membership/careercenter.htm. The minimum ad size is two inches — approximately 100 words. Ads are posted on the Web site within three business days of final approval and remain there for 30 days. If the insertion order is for two months, the cost is \$110 per column inch per insertion and includes a 60-day free Web listing.

For more details on this service, contact Pam Bakken, ASABE Personnel Service, 2950 Niles Road, St. Joseph, MI 49085-9659, USA; 269-428-6337, fax 269-429-3852, bakken@asabe.org, www.asabe.org/resource/persads.html.

ASSISTANT PROFESSOR ECOLOGICAL ENGINEERING

Academic year, tenure-track teaching and research appointment in the Faculty of Environmental Resources and Forest Engineering at the State University of New York College of Environmental Science and Forestry, Syracuse, N.Y. The Faculty offers an EAC/ABET-accredited Forest Engineering program and advanced degrees in environmental resources engineering and mapping sciences. The College specializes in interdisciplinary teaching and research in environmental sciences and engineering. Visit <http://www.esf.edu/hr/search/default.htm> for Position Description and Application Requirements. Application deadline May 12, 2006 or until filled. Position available January 2007.

ENGINEERING SUPERVISOR/MANAGER: TEXAS

Texas based off-road equipment manufacturer seeks \$80K BS POWER & MACHINERY ENGINEER to lead AutoCAD draftsmen in structural design of diesel powered OFF-ROAD heavy equipment. Small company, excellent benefits, promotable position.

Please email your resume to attention of John Rodgers at Agra Placements, Ltd. using jrogers@agrapl.com. Please call 888-696-5624; office 2; extension 26 or 765-472-6635 x 26. Refer to www.agrapl.com for our website.

Personnel Service

FACULTY POSITION ANNOUNCEMENT

North Carolina State University, Biological and Agricultural Engineering

Assistant Professor — Ecological/Water Resources Engineering

Tenure Track, 80% Research, 20% Teaching

<http://www.bae.ncsu.edu/>

<https://jobs.ncsu.edu/>

Search Position # 01-02-0601

Responsibilities: This faculty member will work with other faculty and students to develop a strong research and teaching program in ecological and water resources engineering. The successful candidate is expected to provide leadership in developing research and academic programs for applying engineering principles to the study of watershed ecosystem interactions. Major focus areas may include monitoring and modeling of watershed processes in addition to design and evaluation of engineering techniques for stream and wetland restoration, riparian ecosystem management, and innovative treatment systems for stormwater runoff from urban development, agricultural production systems, and forested lands to provide cost-effective solutions to nonpoint source pollution challenges. The faculty member will be expected to establish a nationally recognized research program with internal and extramural support as well as teach courses in support of the undergraduate and graduate degrees offered by the Biological and Agricultural Engineering Department. The candidate will be expected to work closely with undergraduate and graduate students, including service on graduate advisory committees, and with other faculty in teaching courses addressing ecological and water resources engineering.

Qualifications: Candidates must have a PhD in Biological and Agricultural Engineering or a related field, and a strong background in Ecological and Water Resources Engineering. Preference will be given to candidates with research and teaching experience in ecosystem and hydrologic studies. Candidates must possess the ability and desire to direct graduate student research, publish articles in professional journals, and attract external funding. Excellent verbal and writing skills are required. Registration as a Professional Engineer or eligibility for P.E. licensure in North Carolina is required.

Salary: Competitive and commensurate with background and experience.

Equal Opportunity Employer: NC State University is an equal opportunity and affirmative action employer. All qualified applicants will receive consideration for employment without regard to race, color, national origin, religion, sex, age, veteran status, disability, or sexual orientation. In its commitment to diversity and equity, NC State University seeks applications from women, minorities, and persons with disabilities. ADA Accommodations: Betsy Maness, Email: betsy_maness@ncsu.edu; Phone 919-515-6701; Fax: 919-515-6719.

Application Procedure: Applicants are requested to access our HR job site: <https://jobs.ncsu.edu/> (search Position # 01-02-0601) and attach a letter of intent describing qualifications and interests along with a statement of career goals, curriculum vitae, copies of academic transcripts, and the names and contact information of three references. AA/EOE. NC State University welcomes all persons without regard to sexual orientation. For ADA accommodations, please contact the department at 919-515-6701.

Application Deadline: Applications received by July 31, 2006 will receive first priority but applications will be accepted until the position is filled.



EARTH University is a private, international, non-profit university dedicated to education in the agricultural sciences and natural resources in order to contribute to sustainable development in the humid tropical region. EARTH is located in the humid tropical region of Costa Rica, Central America. EARTH University invites applications and nominations for the position of:

Professor of Waste Management

Responsibilities: The successful candidate will form part of the multidisciplinary faculty of the University and his/her responsibilities will include the following:

1. Teach a waste management course, in keeping with the integrated focus of the academic program.
2. Coordinate a work experience module on integrated waste management and its impact on surrounding communities.
3. Support institutional management of waste treatment, nutrient recovery and rational use of resources.
4. Participate in extension activities, particularly as related to technical assistance and training in the area of integrated waste management systems, and in research projects involving students and collaboration efforts with other institutions.
5. Generate innovative solutions through the use of alternative energy sources.

Requirements: The ideal candidate will meet the following criteria:

1. Master's or doctoral degree (preferred) in Biological and Agricultural Engineering, Environmental Engineering or related area
2. Practical experience in waste management and alternative energy sources
3. Experience teaching at the university level, preferably in an environment applying the principles of student-centered, experiential learning
4. Capacity to motivate students to think creatively and independently
5. Experience in Latin America preferred
6. Proficiency in Spanish (language of instruction) and English
7. Strong skills in leadership and coordination of various teams in a multicultural environment
8. Willingness to live on the EARTH University campus in Guácimo, Limón, Costa Rica.

Application Procedure

Applicants should submit a cover letter describing their qualifications and philosophy with regards to this position, a copy of their curriculum-vitae, and contact information for three references including phone numbers and e-mail addresses. Review of applications will begin immediately and will continue until the position is filled. Please send all documents to Dr. Marlon A. Brevé (mabreve@earth.ac.cr), Dean of Academic Affairs, EARTH University, P.O. Box 4442-1000, San José, Costa Rica. Information may also be sent by fax to (506) 713-0387 or amunoz@earth.ac.cr. Find out more about EARTH University at www.earth.ac.cr.

Annual International Meeting Portland, Oregon July 9-12, 2006 Register Today!

Early Bird Deadline May 12
www.asabe.org/meetings/aim2006/index.htm
800-371-2723

Professional Listings



Agricultural Engineering Associates
John A. George, P.E.
 1000 Promontory Dr.
 Uniontown, KS 66779
 (620) 756-1000
 www.agengineering.com

- Swine Production Facilities
- Beef Feedlots
- Dairy Facilities
- Waste Management Systems
- Livestock Research & Test Facilities
- Soil & Water Conservation Design & Resource Development
- Irrigation Systems Evaluation & Design
- Geologic & Site Investigations
- Soils & Concrete Testing Lab

INDUCTIVE ENGINEERING
DALE GUMZ, P.E., C.S.P.
 715-289-4721
 10805 230th Street
 Cadott, WI 54727-5406

- Accident Reconstruction
- Mechanical & Electrical
- Safety Responsibilities
- Product & Machine Design



Agri-Waste Technology, Inc.
 "Concepts in Agricultural Byproduct Utilization"
L.M. (Mac) Safley, Jr., Ph.D., P.E.
 President
 5400 Etta Burke Court
 Raleigh, North Carolina 27606
 Phone: (919) 859-0669 Email: agriwaste2@aol.com
 Fax: (919) 233-1970 Consulting Engineering

ROBERT B. SKROMME, P.E.
Consulting Engineer
 7440 State Route 703
 Celina, Ohio 45822-2836
 Phone: (419) 586-1227
 Fax: (419) 586-6144

- Expert Witness
- Standards & Regulations
- Product Liability
- Patent Infringement
- Product Safety
- Product Performance

Rodney M. Nohr, P.E.
Consulting Engineer
 USA and International design of Grain, Feed and Bulk Materials handling, storage and processing equipment, bins and silos.
 Suite 200, The Wagner Building
 307-309 Walnut Street
 Yankton, South Dakota 57078-4344
 Tel: (605) 665-1214 E-Mail: nohren2@iw.net
 Fax: (605) 665-8060 http://www.nohrengineering.com



D. Joe Gribble, A.E.
Donald L. Gribble, P.E.
Ted A. Gribble, P.E.
(903) 783-9995
 Fax (903) 784-2317
 P.O. Box 30940, Reno, Texas 75462
 E-mail: fiveg@neto.com • www.fiveg.com
 Professional Engineering and Consulting Services for Dairies, Beef Feedlots, and All Types of Agricultural Waste Management Systems



CURRY-WILLE & ASSOC.
CONSULTING ENGINEERS P.C.
 Animal and Livestock Facility Design
 Feed and Grain Processing and Storage
 Fertilizer/Pesticide Containment Design
 Agricultural Research Facilities
AMES, IA **Lakeville, MN**
515-232-9078 **612-469-1277**
WWW.CURRYWILLE.COM

Mock, Roos & Associates, Inc.
 Engineers • Surveyors • Planners
Agricultural and Environmental Engineering
Soil and Water • Citrus • Dairies • Waste Management
Environmental Assessment • Best Management Practices
Farm Structures • Pump Stations • Agri-Businesses & Farm Plans • Permitting and Design • Water Quality Monitoring • Mapping, CAD & GIS
Dale Wm. Zimmerman, P.E.
 President and Managing Principal
 5720 Corporate Way • West Palm Beach, Florida 33407
 Phone (561) 683-3113 ext. 214 • FAX (561) 478-7248

Irrigation and Wastewater Systems
 Sales and Engineering/Design
www.IRRIGATION-MART.com
 
 300 S. Service Road, E.
 Ruston, LA 71270-3440
 Ph: 800-SAY RAIN (729-7246)
 318-255-1832
 Fax: 318-255-7572
 sales@irrigation-mart.com
 we SAVVY Irrigation
Jackie Robbins, CEO, CID, Ph.D., Agricultural Engineer, P.E.
Jay Robbins, Agricultural Engineer, EI
Robin Robbins, Agronomist

Richard W. Job and Associates, LLC
Rich Job P.E.
 770 Reese Street Liberty, MO 64068
 Phone: (816) 415-8387; Mobil: (816) 223-5927
 Email: rich.w.job@sbcglobal.net
 Consultant:
 Managing the product design and development process; product safety evaluation process; standards application and compliance
 Member: ASABE, SAE

DIEDRICHS & ASSOCIATES, Inc.
"Solutions to Technical Problems"
 Product and Machine Design
 Ag Vehicles and Power Transmission
 Prototype Build, Test and Evaluation
R. O. Diedrichs, P.E. 319-266-0549
 209 Franklin St. Cedar Falls, IA 50613
 www.diedrichsandassociates.com

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.

Leadership/Quality Assurance

James Dooley and Lalit Verma

ABET, Inc. (formerly the Accreditation Board for Engineering and Technology) is the organization responsible for ensuring the quality of degree-granting programs in applied science, computing, engineering, and technology. ABET is a federation of professional and technical societies, each representing one or more disciplines. ASABE is ABET's lead society for agricultural engineering, biological engineering, agricultural engineering technology, and forest engineering. Currently, there are about 2,700 programs, primarily undergraduate, accredited by ABET. Fifty-two of these programs fall within ASABE's disciplines.

Nearly all of ABET's accreditation activities are carried out by volunteers — more than 1,000 volunteers, in fact, participate in the accreditation process annually. Most volunteers serve as program evaluators, individuals selected by ABET's member societies to evaluate programs in their field of expertise. Some volunteers serve as members of ABET's accreditation commissions, which implement accreditation procedures and decisions, or ABET's Board of Directors, which sets organizational policy and approves accreditation criteria.

Managing 1,000 volunteers through 28 separate and distinct member societies can be an extreme challenge, and the number of volunteers only continues to grow. Recently, citing the need for increased consistency among program evaluations; more effective and engaging volunteer training processes; a broader, more diverse pool of volunteers; and a formal, systematic approach to volunteer performance evaluation, reward, and remediation, ABET and its member societies chose to respond aggressively to this challenge. That response is called the Participation Project.

Begun in fall of 2004, the Participation Project aims to optimize the expertise and experience of the volunteers who participate in ABET's outcomes-based accreditation process. Areas being addressed by the project include volunteer recruitment, volunteer selection, volunteer training, volunteer evaluation, volunteer reward, remediation, and removal, and the incorporation of continuous quality improvement into each of these processes.

The Participation Project, led by consulting firm Cardea Communications, includes several phases. During the first phase, Cardea researched all aspects of current volunteer participation processes for a thorough needs assessment and gap analysis. They reviewed ABET training and evaluation materials, attended program evaluator training sessions, and met with educational liaisons from ABET member societies. In addition, Cardea conducted extensive interviews with 40 key participants in the accreditation

process and surveyed 1,648 individuals, including institutional representatives from accredited programs as well as ABET Board members, program evaluators, commissioners, and ABET and member society staff. Cardea also benchmarked several other of ABET's peer accreditors.

The information gathered along with Cardea's recommendations based on that information was used in the second phase of the project when teams of volunteers and society staff joined to build workable solutions to maximize the strengths of the current system and improve areas identified as gaps or needs during the initial phase. The second phase of the project was completed last September.

Arguably, the most important product arising from the teamwork of phase II is the Program Evaluator Competency Model. The model embodies the knowledge, skills, and attitudes exhibited by an effective program evaluator and will serve as the minimum criteria in recruiting and selecting potential program evaluators and as a tool against which each program evaluator's performance will be assessed. The ABET Board unanimously approved the model at its fall 2005 meeting and directed staff to incorporate it into ABET's Rules of Procedure. The Program Evaluator Competency Model is available for download at www.abet.org/volunteer.shtml.

Approval of the model is only the first of many improvements ABET hopes will result from the Participation Project. The project is currently in its third phase where new and enhanced processes for recruiting, selecting, training, and evaluating ABET volunteers are being pilot tested by member societies. These processes are expected to enhance the quality and consistency of the accreditation process to the benefit of accredited programs and the many volunteers and society staff members who carry out this process. The Participation Project focuses on the value-added for all involved. Questions and comments regarding the Participation Project are welcome.

ASABE Fellow James Dooley is ABET secretary and president/CEO of Silverbrook Ltd., 1911 SW Campus Dr., Federal Way, WA 98023-4013; 253-838-7229, fax: 253-815-9900, jdooley@seanet.com.

ASABE Fellow Lalit Verma is a member of the ABET Board of Directors, representing ASABE, and professor at the University of Arkansas, 203 Engineering Hall, Fayetteville AR 72701; 479-575-2351, fax 479-575-2846, lverma@uark.edu.

Views expressed in this article are those of the authors and do not represent the official position of ASABE.



Annual International Meeting
PORTLAND
Oregon
July 9-12, 2006

Preliminary Program

Portland, Oregon
July 9-12, 2006

- 131 technical sessions
- 16 Continuing Professional Development (CPD) seminars
- 6 divisional poster sessions
- 16 technical tours
- 132 hours of professional networking
- nearly 200 committee and subcommittee meetings
- 4 days of product and service exhibits
- 54 cultural tours for adults and kids
- 17 breakfasts and socials
- over 40 additional specialty activities

**Early Bird Registration
ends May 12, 2006**

2006 ASABE

Annual International Meeting

Oregon Convention Center

For more information visit www.asabe.org/meetings/aim2006/index.htm