

FACULTY AWARDS

- Bill Gatzert** Superior Paper Award, ASAE (1997); Superior Paper Award, ASAE (1998)
- Bill Gatzert** Outstanding Engineer of the Year, Iowa ASAE (1997); Team Award for Project of the Year, Illinois Soybean Checkoff Board (1997); Early Achievement in Research Award, College of Agriculture (1999)
- Vic Bekkum** 20-Year Service Award, Iowa Vocational Agriculture Teachers; VIP Citation, National FFA; Mission Award for Teaching, Iowa Gamma Sigma Delta (1998)
- Carl Bern** Member of the Year, Mid-Central Conference of ASAE (1998)
- Dwaine Bundy** Superior Paper Award, ASAE (1998); College of Agriculture Team Award (1999)
- Tom Greiner** ISU Extension Achievement Award
- Mark Hanna** Mission Award for Extension, Iowa Gamma Sigma Delta (1998)
- Jay Harmon** College of Agriculture Team Award (1999); Young Engineer of the Year, Iowa ASAE (1999)
- Steve Hoff** Young Engineer of the Year, Iowa ASAE (1998)
- Charles Hurburgh, Jr.** Man of the Year in Service to Agriculture, Progressive Farmer Magazine (1998)
- Ramesh Kanwar** Honorary Professor, Tashkent Institute of Irrigation and Agricultural Mechanization Engineers; Honorary Professor, Beijing Agricultural University
- Dennis Keeney** Sustainable Agricultural Achievement Award, Practical Farmers of Iowa
- Jeff Lorimer** Iowa State University Extension Achievement Award
- Duane Mangold** Distinguished Service Award, Iowa FFA; VEISHEA Professor of the Year (1998)
- Steve Mickelson** Outstanding ABE Professor, Engineering Student Council (1999)
- Manjit Misra** Certificate of Excellence, American Society of Agronomy (1998)
- Tom Richard** Honorary Scientist, Korean Rural Development Administration
- Charles Schwab** Young Engineer of the Year, Iowa ASAE (1996)
- Jim Shahan** Outstanding ABE Professor, Engineering Student Council (1997)
- Richard Smith** Outstanding Engineering Professor, College of Engineering
- Hongwei Xin** Honorary Professor, Beijing Agricultural University; Newcomer Engineer of the Year, Iowa ASAE (1997)

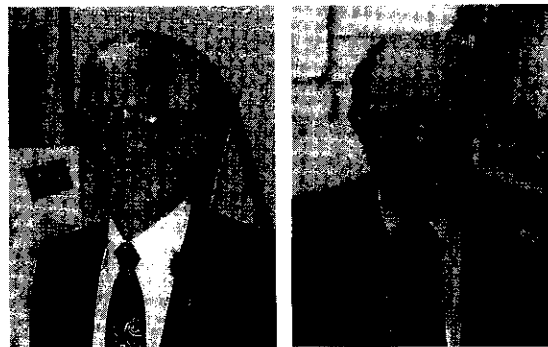
RETIREMENTS

by Office Coordinator Barb Kalsem

In the spring of 1998, after each had served Iowa State University and the ABE department for 30 years, Dr. Richard J. Smith and Professor Morton M. Boyd retired. Richard and Mort will be greatly missed in the university and the department. Both worked in the power and machinery area of ABE. Mort was a full-time teacher and academic advisor for undergraduate students in both AE and AST and was chair of the scholarship committee for many years. Richard was involved in teaching and research and also advised graduate students.

Duane Mangold retired in May of 1999 after almost 40 years of dedicated service. Duane's later years were spent mainly teaching and advising undergraduate AST students. He worked in the structures and environment section of the department.

A great deal of expertise goes with these three gentlemen as they pursue their retirement goals. They all plan to remain in Ames.



Mort Boyd (left) and Duane Mangold enjoying their respective retirement receptions

Thanks to Richard, Mort, and Duane for their years of service!

BIOSYSTEMS LAB

by Associate Professor Bill Batchelor

The biosystems laboratory was designed to support research in computer modeling of biological systems. A team of graduate and undergraduate students, and research scientists representing several states and several disciplines, are working in the lab to solve a range of problems related to modeling corn and soybean growth and yield, and physiological responses to changes in environment and management.

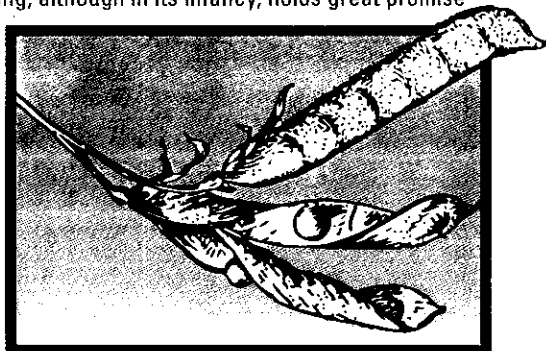


One of the problems addressed is the cause of within-field yield variability that farmers often see on their yield monitors. Computer programs (crop models) mathematically model daily growth in vegetative and reproductive tissue each day of the season as a function of temperature, water and nitrogen stress, pests, plant genetics, and soil type. These models respond at some level to biotic and abiotic stresses that occur on a daily basis. The team calibrates a corn or soybean growth model to mimic measured yield variability within a field using several years of spatial yield maps, soil type maps, pest maps, and management and weather information. Once the model mimics the variability over multiple seasons, a long-term analysis is

then performed to determine how different management prescriptions would perform over a twenty-year period. These prescriptions can assist farmers in evaluating the economics and risks associated with this type of precision farming.

These research projects are funded primarily from commodity groups, including the Iowa Soybean Promotion Board, the Iowa Corn Promotion Board, the Soybean Research and Development Council, the United Soybean Board, and the Leopold Center for Sustainable Agriculture.

Crop modeling, although in its infancy, holds great promise for the future of precision farming.



PARTNERING WITH THE CHINESE ACADEMY OF AGRICULTURAL SCIENCES

by Program Assistant Sue Ziegenbusch

For the past two years, Associate Professor Hongwei Xin has been engaged in research and scholarship collaboration with the Chinese Academy of Agricultural Sciences (CAAS) in the area of animal production. The collaboration tackles issues of mutual interest for CAAS and ISU relative to animal housing, environment control, reduction of environmental pollution, and preservation of natural resources.

In the fall of 1997, Dr. Xin was invited by CAAS to conduct lectures and on-site demonstrations on these issues in China. From March to September of 1998, Dr. Hongmin Dong, director of the Environmental Engineering Laboratory, CAAS, and leader of the Chinese National Key Project on Livestock Production, conducted a seven-month reciprocal visit to Iowa State for further training and collaboration on these topics.

One of the accomplishments during Dr. Dong's visit to ISU was the development of a three-year cooperative research proposal (by Dr. Xin, ABE's Dr. Jeff Lorimor, and Dr. Dong) that has recently been approved for funding by the USDA Scientific Cooperation Program. This collaborative project will allow the researchers to investigate strategies to reduce environmental pollution arising from livestock production. Concurrently, work is nearing completion to establish a formal Agreement of Cooperation between ABE-ISU and AMI-CAAS under the umbrella of the Memorandum of Understanding between ISU and CAAS, previously signed by the presidents of both institutions. That agreement will enhance and expand the scope and depth of academic exchange and collaboration covering livestock production, water quality, and crop production modeling.

TRACTOR-PULLING TEAM

by Regan Hennis, Fall 1998 ASAE Student Engineering Branch President

On May 31, 1998, the 1st annual 1/4-Scale Tractor National Student Design Competition was held in East Moline, Illinois. This event was sanctioned by ASAE. Eighteen universities, from California to Maryland and from Texas to Canada, sent teams. The ABE team of Brad Herman, Shawn Kenny, Matt Oliver, and Josh Gnewuch captured the pulling championship by winning three of four pulls. The team also placed second in the Overall Design Competition and first in both the Serviceability Award and the Safety Award. Based on their performance at the competition, they were invited to the National Garden Tractor Pulling Association Super National Tractor Pull in Tomah, Wisconsin.

The goals of the team were to set new standards for other schools to follow, both in competition and innovation, and to continue the winning tradition at Iowa State. The event is sponsored by Briggs and Stratton, CASE-IH, Caterpillar, Firestone, John Deere, Midwest Super Cub, and New Holland.

The 1999 team of Aaron Bell, Wyatt Compton, Brad Hitchler, Brian Hollatz, and Regan Hennis met stiff competition at the second annual event. They received first place for the written design report as well as awards for serviceability, manufacturability, and craftsmanship. New advances appearing on the 1999 model included an extra gear and an independent front suspension.

Local sponsors for the team were Sauer-Sundstrand, Kinze Manufacturing, Iowa Laser Technology, Mathison Auto Body & Paint, and Ograms Custom Graphics.



Shown with the 1998 winning tractor are (left to right) Matt Oliver, Josh Gnewuch, Brad Herman, Mort Boyd (advisor), and Shawn Kenny.



Senior design tractor team with the 1999 model. Shown are (left to right) Wyatt Compton, Stewart Melvin (department head), Graeme Quick (advisor), Regan Hennis, Brian Hollatz, Keith Schmidt, and Brad Hitchler.

GRADUATE STUDENT AWARDS

ABE CO-OP AND INTERNSHIP OPPORTUNITIES

by Associate Professor Steve Mickelson

All agricultural engineering students are encouraged to obtain meaningful engineering work experience sometime during their undergraduate education at ISU. Students may obtain co-op or internship experience during their sophomore, junior, or senior year(s) of study. Prior to beginning a co-op/internship work period, students register for a no-credit course (AE 298, AE 397, AE 398, or AE 498). These courses will appear as part of a student's permanent record. Many co-op and internship employers come to campus to interview and hire students at the Engineering Career Fair during Engineers' Week in the fall and the Engineering Job Fair in the spring. Other opportunities are made available through the Engineering Career Services Office.

Placement statistics are quite impressive for those students who availed themselves of these opportunities. In the College of Engineering, 95% of those Spring '99 graduates with co-op experience were placed, as well as 85% who had been interns and 79% who had summer work experience. These figures exceed those for graduates with no industry experience.

Sixty-seven percent of our Spring '99 AE grads had prior industrial experience. We are continuing to increase participation in this program. Employers participating with ABE include Ag Leader Technology, Almaco, Amana Appliances, Blue Bunny, Case, Caterpillar, Centro, Growmark FS, John Deere, Energy Panel Structures, Husco International, Iowa DOT, Melroe Ingersoll Rand, Montgomery Watson, Pella, Popp Engineering, Proctor & Gamble, Quantum Chemicals, Sauer-Sundstrand, USDA-FGIS Tech Center, USDA-NRCS, and Vermeer. It is also a goal to increase the number of businesses involved.

More information on the AE co-op/internship program can be obtained from the departmental homepage at <http://www.ae.iastate.edu/>.

L Majdi Al-Muhaideh, MS '98, along with a \$100 stipend. As a graduate student, Majdi's area of research was in precision farming techniques for continuous yield measurement, with Professor Tom Colvin of the National Soil Tilth Lab as his major professor. Majdi has recently been accepted into the ABE doctoral program.

Recipients of the 1997 and 1998 Taiganides Award were **Jinquing Shao, PhD'97**, and **Ana-Sofia Azevedo, PhD'98**. This award for doctoral candidates is given for excellence in scholarship and overall performance and carries a stipend of \$250. After completing her research of swine thermal comfort behavior, as measured using bio-imaging, and receiving her degree, Dr. Shao became a postdoctoral research associate at the University of Arkansas and is pursuing another Ph.D. in electrical engineering. Upon completion of her doctorate, Dr. Azevedo returned to her native Portugal to pursue a career in engineering consulting.

ALUMNI DAYS '98

In conjunction with ISU's Alumni Days '98, the ABE department hosted a reception in June, inviting retirees, friends, faculty, and staff to spend time with returning alumni. Shown here are (front, left to right) **Dale Hull, BSAE'39, MSAE'40**; **Wendell Van Syoc, BSAE'48**; **Howard Johnson, BSAE'49, MSAE'50, PhDAE'59**; **Everett Sandahl, BSAE'41, MSAE'53**; **Harris Hart, BSAE'38**; (back, left to right) **Eugene Smith, BSAE'47**; **Don Shimon, BSAE'48**; **Thamon Hazen, PhDAE'56**; and **Leo Soderholm, PhDAE'71**.



POROUS MEDIA LABORATORY

by Professor James Baker

The porous media laboratory (135 Davidson Hall) was completed in 1998. It contains a permanent rainfall simulator capable of producing uniform rainfall similar in drop-size and energy to natural rainfall (see picture). It can provide rainfall at intensities from 0.1 to 5 inches/hour on horizontal areas as large as 5 x 10 feet, and/or columns of soil up to 4 feet long. A field version of this simulator was used with lysimeters to successfully test the performance of a conceptually new nitrogen (N) fertilizer applicator developed by ABE that compacts and domes the soil over a line source of N from a knife. This action diverts infiltrating water away from the N and reduces N leaching and increases N-use efficiency. Patent 5,797,459 was issued in August 1998 covering the new method and tool, and a manufacturer is being sought.

The rainfall simulator in the porous media laboratory has been used to demonstrate to classes and visiting groups the importance of surface crop residue with conservation tillage in controlling soil erosion from water and to perform a water-quality leaching study with soil columns. It is anticipated that the rainfall simulator will be heavily used in a new study of the impact of phosphorus (land-applied as animal manure) on surface water quality. The laboratory area will also be used to study the runoff fate of fall-applied herbicides, such as Dual and Surpass, under both simulated rainfall and simulated snowmelt.

Part of the laboratory space contains a heavily used walk-in cooler necessary for storage of the many soil, water, and plant samples taken in our numerous environmentally oriented projects. The remaining area in this 30-ft-by-30-ft room is used for teaching (e.g., AE 422 hydraulic labs) and for other research. During 1998, this area was used to develop and test procedures for measuring seepage rates of earthen waste storage basins and then as the "staging area" for the extended field monitoring of manure pits and lagoons that occurred all over Iowa during the July-October period.

This renovated lab has already proven to be very useful and will continue to be of value in developing and performing research involved in the pursuit of sustainable agricultural production while minimizing adverse environmental effects on our soil, water, and air resources.

AE 110 class project emphasizing the importance of infiltration rate, as affected by conservation tillage, on runoff and soil erosion.



Photo: View through plastic rain curtain showing digital rain gauge and soil bins with and without corn residue. **Insert:** Overhead rain-producing nozzles and troughs.

AE EMPLOYMENT OPPORTUNITIES

by Professor Carl Bern

Agricultural engineering bachelor's degree graduates have continued to find good employment opportunities in spite of problems in the agricultural economy. The agricultural equipment industry is, as usual, the largest employment area. Processing companies, animal equipment manufacturers, and consulting firms continue to hire our graduates. Each semester, one or two graduates accept assistantships and enter graduate school. For Fall '98 graduates, salaries in industry averaged just over \$41,000 per year. For Spring '99, this average increased to \$44,000.

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RUBBER TIRES ON TRACTORS A HISTORIC LANDMARK OF AGRICULTURAL ENGINEERING

Early tractors were massive and expensive. Their steel lug wheels gave poor traction and a rough ride. Lugs were prohibited on many roads.

1926 Hoyle Pounds modified a Fordson tractor with zero pressure truck tires on special rims to improve performance on sand soils in Winter Garden, FL. A successful business resulted.

1929 Hessel Roorda equipped Farmall tractors with low pressure rubber tires to pick corn in muddy fields near Rock Valley, IA. Farmers found they performed well in all conditions.

1932 Allis-Chalmers, urged by Harry Merritt, Tractor Division Manager, supplied a WI farmer with a Model U tractor with Firestone aircraft rubber tires at low pressure. This system operated unmodified for 8 years.

Farm magazine ads in 1934 quoted several university reports of as much as 1/3 less fuel and 1/4 more work with low pressure rubber tires compared to steel lugs. No new tractors in 1930 had rubber tires, by 1940, most did.

DEDICATED BY THE AMERICAN SOCIETY OF AGRICULTURAL ENGINEERS 1997

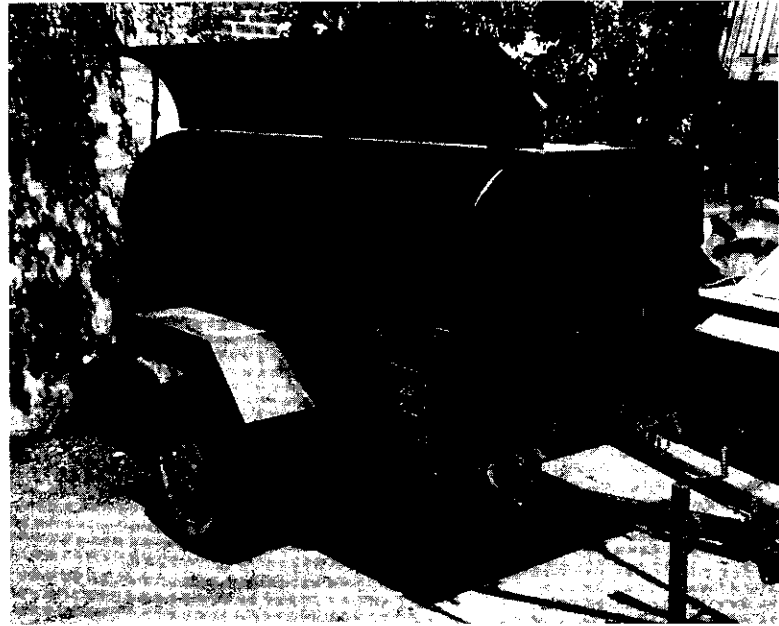
ASAE STUDENT ENGINEERING BRANCH EVENTS

by Regan Hennis, Fall 1998 ASAE Student Engineering Branch President

In 1998 the Iowa State University ASAE Student Engineering Branch participated in a wide variety of activities and received several awards. The club was very active on both the university and national levels.

The club members kicked off the fall semester at the annual ABE Ice Cream Social. In February the ASAE Club co-hosted the senior banquet with the Agricultural Systems Technology Club. Students' parents along with members of the ABE department and their families were invited. In April and May, several club members participated in the paper and design project competition at the ASAE Mid-Central meeting in St. Joseph, Missouri. The finalists and several other ASAE representatives then went to the very hot International ASAE convention in Orlando, Florida, for presentations and competitions. Throughout the year, the club sent representatives to the Iowa Section meetings in Ankeny and Waterloo.

The ASAE Club was very fortunate to receive many awards during 1998. The student branch started the year off early by winning an Honorable Mention in the National Engineers' Week Publicity Competition by dressing up in costumes and promoting farm safety with the "Tug of War with Grain" display. At the 1998 ASAE International Conference, Robert Cogdill received first place in the Kenneth Barnes Student Paper Award Competition (see page 16). At this meeting, the ISU student branch received 2nd place in the Equipment Manufacturers Institute (EMI) Student Club Report Competition. Also, two representatives from the club's ASAE 1/4-scale tractor design competition gave a presentation on their tractor's design.



ASAE Student Engineering Branch Rolling Grill

The club's largest project for 1998 was, without a doubt, design and construction of the "rolling" grill—made from an old military trailer (see above photo). This gave the club 32 square feet of cooking surface for fund-raising activities. The first unveiling of the monster was for the 1998 Ag Week, and this one event almost paid off the entire investment in the grill. The club also used the grill for a dinner exchange with the University of Nebraska at Lincoln ASAE Section. These students came over the night before the Iowa State vs. Nebraska football game for a tour of ISU's facilities, followed by a social.

The ISU student branch also got involved in the community in 1998. Several members helped with a Halloween Haunted House for grade school students. Club members helped kids play pin the nose on the pumpkin and make Halloween cards.

Last spring, the members were able to purchase Carhartt jackets embroidered with the ASAE and ISU logos, which gave the club recognition around campus.

The ASAE Club has kept very busy and active in the past year. All in all, members are looking forward to winning more awards and to getting the grill "smoking" for a very exciting 1999.

From multiple awards to a "rolling" grill to logo jackets, it was a very good year for the Iowa Student Engineering Branch of ASAE!



STUDENTS TAKE FIRST AND THIRD IN NATIONAL COMPETITION

by Professor Carl Bern

ASAE-sponsored competition draws entrants from across the continent—we're proud to have two of the winners in ABE!

Rob Cogdill (left) and Howard Butler, currently both grad students in ABE, took first and third places, respectively, in the K. K. Barnes Student Paper Competition held in Orlando, Florida, in July 1998. The competition is sponsored by ASAE to encourage undergraduate research in subjects of interest to ASAE members and industries they serve. It is open to undergraduate students from across the U.S. and Canada. The top three entries in an initial written competition were invited to Orlando for an oral run-off competition. Cash awards of \$500 for first and \$200 for third were given, along with trips to the International ASAE meeting in Orlando.

Cogdill is the son of Patrick and Joyce Cogdill of Dunlap, Iowa. His paper was entitled "Modeling the effects of splits on soybean deterioration." He is currently enrolled in the department's BS/MS program and is employed as a research assistant by Professor Charles Hurburgh in the Grain Quality Lab.

Butler's parents are Tom and Christine Butler of Blooming Prairie, Minnesota, and his paper title was "EMI prediction of soil clay content: A precision farming tool." He has received his BSAST but remains in the department as a graduate student, teaching assistant, and research assistant for Professor Tom Colvin at the National Soil Tilth lab.

THE DAVIDSON DISPATCH
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