

Davidson Dispatch

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Thoughts and Views

By James R. Gilley
ABE Dept Head

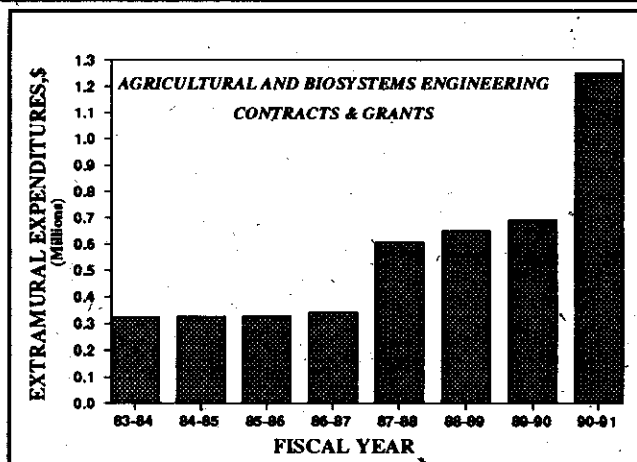
This has truly been an exciting year for our department; one full of opportunities, yet disappointing in others. As highlighted in other sections of the newsletter, the department faculty and staff had a very productive and rewarding year. Several received national awards in recognition of their excellent programs. The department truly has excellent support from faculty, staff, students and alumni.

In last year's newsletter we reported that the department was awaiting action on a proposal to change its name from Agricultural Engineering to Agricultural and Biosystems Engineering. This name change, received much debate in the faculty senate and the vote was delayed twice. Finally, after much discussion and faculty involvement across campus, the name change was approved by the Faculty Senate in December, 1990. The Board of Regents approved the change at its February, 1991, meeting.

We are really pleased with the enrollments in department programs this fall. The enrollment in Agricultural Engineering has increased to 85 (from a low of 59 in 1988) and the enrollment in Agricultural Systems Technology is now 60 (from a low of 35 in 1988). We are certainly pleased with these changes and will continue to work hard at recruiting students into both majors. We have been very successful with on-campus recruiting, attracting 10 new students in AE and five new students in AST this fall. There are eight students in the new biosystems engineering option. Unfortunately, our graduate student enrollment has declined approximately 20% over the past three years.

An article describing our recruiting efforts appears later in the newsletter. Another positive note was the inclusion of a new facility to replace an aging Davidson Hall on the Board of Regents five-year capital plan. We are pleased that this badly needed building has received a high priority on campus and in the Regents system. We need your continued support to maintain a high priority for this facility and to make a new building a reality.

Through effort by the department faculty, the level of grants and contracts in all three areas of our programs (teaching, research and extension) has greatly increased the last few years. The total level of extramural expenditures now totals over \$1.2 million per year (see Figure). These funds have allowed the department to develop new and expand several research programs. Unfortunately, the existing labo-



ratory space in Davidson Hall is not sufficient to handle (quantity or quality) these increased programs and the faculty have been forced to find other locations. Modifications to Davidson Hall will allow us to expand in the short run, but in the longer term, new facilities are required for us to meet the needs for the department's projected research and teaching programs.

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Undergrad Research Sounds Out Bean Bar Noise

By Debra Bell Geiser

A summer of testing the sound level exposure of riders of bean bars—those contraptions attached to the front of a tractor that carry two or more workers removing weeds from a soybean field—has convinced ISU senior Roger E. Meyer that bean-bar riders need to wear protective hearing gear.

His experience also convinced the agricultural engineering undergrad from Blue Grass, Iowa, that safety research could be a rewarding way to direct his engineering career.

Meyer was a participant in last summer's Department of Agricultural and Biosystems Engineering (ABE) undergraduate research experience program. Funded by the National Science Foundation (NSF), the program aims to get engineering students interested in graduate studies by giving them an opportunity to work closely with faculty involved in challenging research projects.

So far 17 engineers have completed the program, said director Carl J. Bern, professor of ABE. In

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President Jischke Visits Department

Dr. Martin Jischke became President of Iowa State University on Saturday, June 1, 1991. A portion (3 hour period) of his first day on the job consisted of a visit to the College of Agriculture. Included was a brief tour of the Department of Agricultural and Biosystems Engineering. During the walking discussion we highlighted the history of the department, existing programs and the need for a new facility. He viewed our computer facilities, the water quality lab and the animal environment lab. President Jischke also spoke at the Iowa Section meeting which was held on campus, October 3. He is now aware of the need for new facilities for the department to expand new teaching, research and extension programs.



James Baker, Professor in ABE, discusses research with President Jischke during his walking tour of the Department.

Undergrad Research Sounds Out Bean Bar Noise

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addition to defining and carrying out a research project, Bern said students hone their communication skills by presenting oral and written reports.

And they've been successful. "An ag engineering student who studied soil compaction under tractor tires during the first summer (1990) of our program wrote a paper that won the 1991 national student paper competition sponsored by the American Society of Agricultural Engineers (ASAE)," he noted.

Meyer worked under the direction of Charles V. Schwab, an extension agricultural engineer and safety specialist interested in the microenvironments of agricultural workers. "Picture a capsule around a worker out in the field," said Schwab. "I'm interested in things that penetrate this small environment and cause health problems."

Meyer, who wanted to investigate tractor noise, spent two weeks in the Parks Library narrowing down his project. "Since 1972 the University of Nebraska has collected standard test data on sound levels in the many models of tractors, but bean bars are a relatively new piece of equipment," said Meyer. "There's been no research in that area." He decided to tackle it.

The first step was taking decibel readings 25 feet away from his test rig--a 1990 John Deere 2955 six-cylinder tractor fitted with a bean bar--running on concrete to see how well they matched the Nebraska data. After this initial calibration, Meyer fitted two volunteer riders with shoulder micro-

phones connected to hand-held dosimeters (sound analyzers) and took decibel measurements in soybean and grass fields.

Prolonged exposure to noises of 85 decibels produces gradual hearing loss. Meyer's results predicted a person would receive a dose of 90 decibels or more over an eight-hour period in the bean field and eight-hour dose of 94 decibels in the noisier grass field. "We ran the rig on the grass after the beans grew too tall," said Meyer. He believes the grass field results are closer to the correct bean field readings, because the taller beans muffled the sound level to which the riders were exposed.

Meyer's results argue that bean-bar riders need to take hearing protection precautions, and he plans to use the standard data from the Nebraska tractor tests and his findings to develop a prediction procedure that farm managers can use to minimize the exposure of bean-bar riders to harmful sound levels. He is writing a paper he hopes to have published in the *ASAE Transactions*, a technical journal, and Schwab is encouraging him to write an extension pamphlet, too.

The research experience has been interesting, said Meyer, who applied for the program to find out what graduate school would be like. "I didn't realize all the work that has to be done before you can even touch a piece of equipment," he admitted. "I thought most of the work of research was doing the experiment, but that was actually only about five percent

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of the work--and the easiest part." The most difficult and time-consuming part of the project was determining which questions to ask and how to ask them to get useful results, said Meyer, who spent two weeks in the library searching the literature for information on tractor noise levels.

Schwab compared the department's NSF program for undergraduates to "a short graduate program that you can see the results of in a semester. But we're hoping that's long enough to get these kids interested in research," he said. "That's the hook--you can uncover new ideas that branch out, and you can make your project as big as you like. That's the thrill."



MANY BENEFIT FROM NSF PROGRAM

The following six undergraduate students participated with Roger in the summer 1991 Research Experiences for Undergraduates (REU) Program:

William Watts, ME4, ISU, Ankeny, IA, worked with Don Erbach on "Three dimensional soil displacement under moving tires".

Scott Wilenborg, EE3, ISU, Dyersville, IA, researched "A corn-ear rotational device for use with a computer imaging system" under Manjit Misra.

Mark Devore, AgE4, ISU, Seymour, IA, studied "An expert system for use as a soil nutrient decision aid" with U.Sunday Tim.

Ethel Finch, CE3, University of Washington, Auburn, WA, worked with Ramesh Kanwar on "Comparison of four soil pore liquid monitoring techniques".

Alfredò Nevarez, ME3, ISU, Wheaton, IL, studied "Special variability of the temperature-humidity index in a slot-ventilated confinement swine facility" under Steve Hoff.

Gene Rath, ChE3, ISU, Missouri Valley, IA, worked with James Baker to research "Adaptation of recently-developed tracers to the study of leaching in soil columns".

Each of the students worked full-time for nine weeks to define, complete, and prepare a report on their project. They received a \$2,500 stipend.

This academic year four students are participating in the program on a part-time basis.

The program is exciting in that it benefits students from a variety of curriculums as well as faculty. Recently, Carl Bern coordinated the submission of a proposal to seek continued funding of this program from the National Science Foundation. This proposal contained a wider range of potential projects submitted by a greater number of faculty members and will continue the program through 1994, if approved.

Bern also had the opportunity to describe our program at a meeting with over 40 REU project managers in Orlando, Florida, in November. The ISU-ABE program was one of five chosen to give presentations describing project activities. It is the only one located in an ag engineering department. All programs are striving to include women and minority students among their participants. There will be special emphasis on including handicapped participants in the future. There is also interest in undertaking projects involving ethics issues. NSF remains committed to the REU concept and funding is expected to increase in coming years.

Department External Review

The Agricultural and Biosystems Engineering Department underwent a Cooperative State Research Service (CSRS) comprehensive review by a team of six external members May 5-9, 1991. During their exit report, the review team indicated that in general we were on the right track and challenged us to redouble our efforts to continue the excellent tradition at Iowa State. They were impressed by the quality and breadth of programs but indicated that future resources might force us to narrow the scope of the programs.

Dean Topel Visits For A Day

Dr. David Topel, Dean of the College of Agriculture, visited the Department on July 10, 1991. His agenda included all facets of our department programs:

- Soil and water engineering was discussed at the Agricultural and Biosystems Engineering and Agronomy Research Farm where soil and water engineering research was discussed.
- At the Seed Science Center computer vision laboratory food and process engineering research was discussed.
- Midwest Plan Service.
- Machinery and safety activities.
- Animal environment and waste research.
- Instructional and computer facilities in Davidson Hall.

Dean Topel also held an open meeting and had lunch with Department faculty and staff. It was a productive and informative day.



MidWest Plan Service Activities

MWPS Hires Engineer: On July 1, 1991, Frederick W. (Bill) Koenig joined MidWest Plan Service as the new plan service engineer. Bill attained his Master of Science in Agricultural Engineering from Iowa State University.

National Symposium Planned: MidWest Plan Service is sponsoring the *National Symposium on Pesticide and Fertilizer Containment: Design and Management* which will be held February 3-5, 1992, at the Westin Crown Center, Kansas City, Missouri. The Symposium is intended for designers and builders of facilities; consulting engineers; industry personnel responsible for containment and compliance; federal, state and municipal regulatory personnel; and university research and extension personnel. The Symposium is in conjunction with the release of the MidWest Plan Service handbook, *Designing Facilities for Pesticide and Fertilizer Containment*, MWPS-37.

New MWPS Handbook: MidWest Plan Service is broadening its scope beyond the structures and environment area with its forthcoming handbook, *Conservation Tillage Systems and Management Handbook*, MWPS-45. The handbook will provide unbiased, research-based information on all major aspects of choosing and managing a conservation tillage system. Proposed publication date is March, 1992.

Ann Armstrong Retires

A retirement party was held in honor of Ann Armstrong on August 28th. It was a memorable party with many people attending to recognize her 11 years of service to the Department. Those 11 years were enough time for her co-workers to know what were Ann's favorite things: Some of her most favorite things cleverly found their way to the party--big band music, an original danceline, a music box with a butterfly, fresh flowers, and a book of memorious pictures and letters. We will all miss Ann's cheerful attitude around the department, and all wish her many years of enjoyable retirement.



Davidson Hall Takes On More New Looks

Several changes have been made to Davidson Hall in the last year:

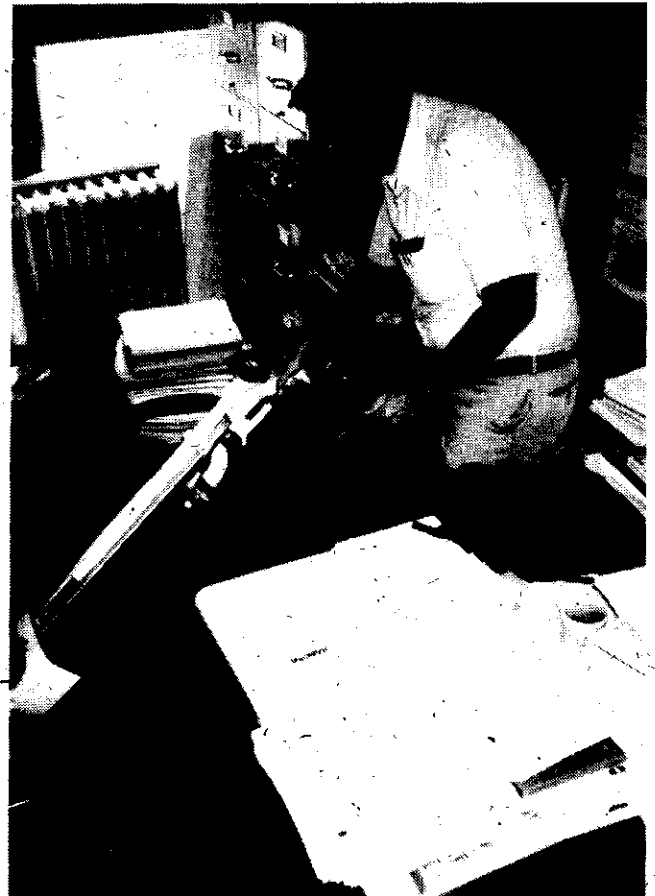
- Over the summer, room 124 was renovated by putting in a wall, dropped ceiling, floor tile and new tables and chairs. This has created a more useful classroom.
- Fire safety construction was begun over the summer and was recently completed. Many fire doors and outside exits were added throughout the building. The stairways were made narrower to create the necessary landing with a fire door at the top of the stairs.
- A departmental library is being developed in room 119. This will hold graduate thesis and disserta-



tions as well as journals and reference materials received in the department.

- The mailroom has been cleaned out and spruced up with new furniture, floor tile, paint and pictures.
- Classroom 115 is slated for renovation this coming spring by the university. We anticipate the positive change that will make in our educational environment.

University budget constraints have also dictated changes in services. Janitorial services are the most noticeable change for faculty and staff. It is no longer extraordinary to see faculty and staff vacuuming and heading out to the dumpster with their garbage.



Thoughts and Views

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On the downside, the state's economy has forced budget reductions at Iowa State University. Our department was required to reduce its teaching and research budget by 7% last July 1. This required a number of difficult decisions and we were forced to reduce staff. We are hopeful that further reductions will not be required. We will utilize our capability of generating extramural funding to continue our growth plan for the department.

One of the most enjoyable parts of serving as the Head of the Agricultural and Biosystems Engineering Department at Iowa State University is the opportunity to meet and visit with our alumni and other supporters across the state and country. You are justifiably proud of your department and are a source of energy for me.

As always, please keep us informed of your activities, both professional and personal. And do stop by and say hello.

George Price Grieve Scholarship Established

On August 30, 1991, George Price Grieve (BSAE '34) and his wife Helen established an endowed George Price Grieve scholarship in Agricultural and Biosystems Engineering. This scholarship will be open to juniors and seniors majoring in Agricultural Engineering and maintaining a minimum GPA of 3.0. Academic achievement will be the primary credential for receiving this scholarship. It is anticipated that the endowment will provide 2-3 \$2,000 scholarships per year.

Grieve first worked for the Civilian Conservation Corps on soil erosion control in Iowa, keeping his 2nd Lieutenant's commission active in the Army. His army commission resulted in a long stretch of active combat duty; he served four years in World War II, mostly in the South Pacific.

Following his war duty, Price settled in the Chicago area and began his own business. In the early years he was the company's only engineer. Since 1953, Price has been Chairman of the burgeoning company, which moved and expanded its facility four times to allow for business expansion. Now the Grieve facility has the latest sophisticated CAD equipment in its engineering de-

partment and CNC punching equipment in its modern manufacturing plant. Grieve industrial ovens and furnaces are well known throughout the industry for their high quality.

In 1990, Grieve was honored with a PACE Award from the College of Engineering. Chicago TV station CSTV honored Price Grieve as a leader in industry in 1988.

Pictured below are Dean of Engineering David Kao, Dean of Agriculture David Topel, Price, his wife Helen and ISU President Martin Jischke.



Honors and Awards

Faculty Promotions

CHARLES HURBURGH, JR., RAMESHWAR KANWAR, and MANJIT MISRA were promoted from associate professor to professor as of July 1, 1991.

Faculty Honors and Awards

CARL BERN received the *Special Service Award at the 1991 Mid-Central Conference of the ASAE*. This was the first year this award was presented. It was established to recognize those who provide special service to the conference. Bern was recognized for his long-time efforts supporting the student paper contest and his teaching excellence.

MORT BOYD received a *National Association of Colleges and Teachers of Agriculture (NACTA)*

Teacher Fellow Award at the 37th NACTA Annual Conference in Edmonton, Alberta on June 18, 1991.

DON ERBACH, November 29, 1990, received a *USDA Certificate of Merit* for performance in reporting research results. October 7, 1991, was named *National Soil Tilth Lab Employee of the Quarter*.

TOM GLANVILLE was awarded the *"Outstanding Service Award" of the Iowa Groundwater Association* at their annual meeting in Des Moines on October 30th. The award was presented in recognition of Tom's authorship and technical support of House File 325, a bill on "Well Contractor Certification", which was passed by the Iowa Legislature in 1991.

RAMESH KANWAR was chosen as one of seven finalists for the 1991 Margaret Ellen White Graduate Faculty Award. The award "recognizes the efforts of major professors who serve as mentors and who en-

Honors and Awards

Faculty Honors and Awards continued

rich the student professor relationship by support and attention to detail which enables students to finish their work in a timely and scholarly manner." Only one award is given and although Ramesh was not chosen, being a finalist is certainly an honor. On December 15, 1990, Ramesh received a *Distinguished Alumnus Award from the College of Agricultural Engineering, Ludhiana, India*, and the Punjab Chapter of Indian Society of Agricultural Engineers. The award recognizes his contributions to the agricultural engineering profession. Dr. Kanwar received the *College of Engineering's Young Engineering Faculty Research Award* for studies on the movement of fluids and chemicals through soil, which apply to agricultural drainage and water quality. He has been named a member of the Editorial Board, *Asian Agricultural Engineering Journal*, April 1991-1993. Kanwar received the *ASAE Achievement Award for IA Section*, October, 1991.

DUANE MANGOLD was named *outstanding agricultural engineering professor by students*, 1990-91. Dr. Mangold was chosen one of Iowa State University's outstanding teachers. He was selected as one of forty-six Iowa State University faculty members to receive a *Legislative Teaching Award*.

STEWART MELVIN was named the *1991 Engineer of the Year by the Iowa Section* of the American Society of Agricultural Engineers.

VERN MEYER as part of the Swine Extension Team, received the *ASAE Blue Ribbon Award* for their videotape, "European Pork Production".

CHUCK SCHWAB AND MARK HANNA received the *ASAE Blue Ribbon Award* for a video production titled "Agricultural Equipment Operator Safety Series" from the ASAE Educational Aids Competition.



Student Honors and Awards



Brian Fischer was named the National ASAE Student Agricultural Engineer of the Year for 1991 at the annual ASAE Iowa Section meeting held October 3, 1991 in Ames. Brian is a senior in Agricultural Engineering at Iowa State University. The award is presented annually to the outstanding junior (third year) student by the American Society of Agricultural Engineers (ASAE).

As the winner, Fischer receives the John G. Sutton Memorial Award consisting of a plaque, cash award, and a travel allowance for attendance at an ASAE international meeting. A plaque was also given to the Agricultural Engineering Department at Iowa State.

In writing about his career goals Fischer says, "As an agricultural engineer, the food industry is where I hope to spend most of my working career. Research and development is what I am most interested in because I am fascinated by the challenge of using new technologies to make food production a safer and more efficient industry."

Selection of the "Student Agricultural Engineer of the Year" is based on the following factors: excellence in scholarship, outstanding character and personal development, activity in student organizations devoted to professional development, participation in overall school activities, personal leadership qualities, creativity, initiative, and responsibility.

Carol Lehtola received a Teaching Excellence Award from the ISU Graduate College and Graduate Student Senate spring semester 1991.

Steve Mickelson, assistant professor in Engineering Fundamentals and Multidisciplinary Design and graduate student in ABE, received the 1990 Dow

Honors and Awards

Student Honors and Awards continued

Young Faculty Award from the North Midwest Section of the American Society for Engineering Education.

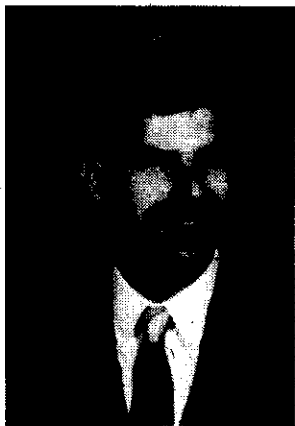
Richard Steffen received a Teaching Excellence Award from the ISU Graduate College and Graduate Student Senate spring semester 1991.

ISU Student Branch of the ASAE took first-runner up honors in the annual Equipment Manufacturers Institute (EMI) Trophies Competition for branches of fewer than 30 members. EMI presents awards to the student branches which compiled the most outstanding record of activities and achievements in the previous year. The award was given at the EMI luncheon during the ASAE International Summer Meeting in Albuquerque, New Mexico, June 24, 1991.

Alumni Awards

Patricia L. Boddy, BSAE '80, MS Water Resources '90, was named the recipient of the Outstanding Young Alumnus Recognition and was recognized at Alumni Days on campus June 6-8, 1991.

Thomas C. Haan, Ph.D. AgE '67, was named a recipient of a Professional Achievement Citation in Engineering (PACE) Award and was recognized at Alumni Days on campus June 6-8, 1991.



Gerald Kinney, BSAE '90, earned a first-place finish in the 1991 K.K. Barnes Oral Student Paper Competition sponsored by the American Society for Agricultural Engineers (ASAE). Kinney won for his presentation of a technical paper entitled "Soil Strain Under Three Tractor Configurations" at the society's June 24 international summer meeting in Albuquerque, New Mexico. Gerald is a test

engineer for the Deere & Co. Product Engineering Center, Waterloo, Iowa. He conducted his research for the paper as part of a National Science Foundation undergraduate research experiences program at ISU. His faculty adviser for this project was Don Erbach.

Stewart Nelson, Ph.D. AgE '72, is a research engineer at the USDA's Russell Research Center in Athens, GA has recently received two honors:

Alumni Awards continued



He was honored in June 1991 by the Georgia Society of Professional Engineers (GSPE) at its annual meeting in Destin, FL. He received the Engineer of the Year in Government award.

Nelson was recognized for his research with the Agricultural Research Service on dielectric properties of materials and their agricultural applications.

These include stored-grain insect control, seed treatment, dielectric and microwave heating for product conditioning, and radio-frequency and microwave measurements for moisture sensing in grain and other products.

The National Society of Professional Engineers, the parent society of GSPE, named Nelson the Federal Engineer of the Year in 1985.

Stuart Nelson was also inducted as a new member of the National Academy of Engineering during its annual meeting in Washington in October of 1990.

Election to membership is a singular honor conferred upon distinguished engineers by their peers. Nelson was honored "for pioneering applications of dielectric properties of seeds and insects related to radio-frequency treatment and processing."

Kenneth L. McFate, BSAE '50, and President Emeritus, National Food and Energy Council of Columbia, MO, received the Honorary American FFA Degree, at the 64th FFA Convention in Kansas City. McFate was recognized with the highest award of the National FFA for his 41 years of continuous support for electrical energy efficiency and safe agricultural wiring education at local, state and national levels. That support extends over his professional engineering career following graduation from Iowa State in 1950. He was a member of the ISU Ag Engineering Department faculty from 1951 to 1956.

