

June 2000

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**to the
University of Illinois Hospitality Reception
at the
93rd Annual International Meeting of ASAE**

When: Monday, July 10, 2000 – 8:30 p.m. to 10 p.m.
Where: Empire Room (2nd Floor), Milwaukee Hilton

The Department will be hosting this alumni reception. Stop by and visit with alumni, faculty, staff and friends, meet the new faculty members and renew old friendships.

Mark your calendars!

FROM THE DEPARTMENT HEAD ...

The Department has completed another successful year. It is always enjoyable to attend the commencement ceremonies and see the faces of the happy students and proud parents. The job market for our graduates remains excellent with very good starting salaries. The student clubs remain very active and the annual awards banquet in April again demonstrated the high quality of our students.

Changes continue to be made: Two new faculty members joined the department in March: Kent Rausch is an Assistant Professor in Food and Bioprocess Engineering and Shufeng

Han is an Assistant Professor in Off-Road Equipment Engineering specializing in precision agriculture.

We are installing new carpet in all our offices so the building will be in some disarray during much of June. However, the inconvenience will be worth the chance to do some spring-cleaning and having a new look to the offices.

Our primary strategic action item is to develop a new process for evaluating our educational goals and assess student outcomes. This is partially in preparation for our accreditation review (ABET) in October 2001.

We will be asking for your input in assessing our teaching program. It is important to have stakeholder feedback to verify that we are preparing the best-equipped graduates possible.

Finally, I hope to see many of you at the ASAE meeting in Milwaukee in July. We are hosting an alumni reception on Monday evening and look forward to catching up on happenings in your lives.

Loren E. Bode
Head of Department

DEDICATION OF THE MECHATRONICS PROGRAM AND FACILITIES

On January 13, 2000 the Department held a dedication of the Bruce Cowger Mid-Tech Mechatronics Program. A major gift from Mid-west Technologies, Inc. provided funds for constructing three new laboratories for our new program in mechatronics. The gift was provided to the University of Illinois to recognize the leadership Mid-Tech has provided in the area of mechatronic technology and memorializes the founder, Bruce Cowger.

Mid-Tech is an Illinois-based manufacturer of electronic sprayer controls for agricultural applications and is a leader in direct injected sprayer control technologies using internally expandable systems.

Precise and flexible applications and record keeping of chemical and fertilizer applications for site-specific farming represent major technologies possessed by the company.

Several representatives from the Mid-Tech Management Team and many of Bruce Cowger's family came to campus for the dedication and tribute to the founder of the company. A permanent plaque christening the **Bruce Cowger Mid-Tech Mechatronics Program** was unveiled during the ceremony. The program leader, Dr. Qin Zhang provided a vision of the program and conducted a tour of the newly renovated laboratory facilities.

The department is very thankful and appreciative of the gift from Mid-Tech that will impact all of our students specializing in Off-Road Equipment Engineering.



*Greg Moore, Joyce Cowgur, Lynette Marshall
and Loren Bode*

MECHATRONIC SYSTEMS TECHNOLOGY FOR OFF-ROAD EQUIPMENT

Mechatronics is the study of novel machinery – machinery with a “brain.” Such machinery is integrated with mechanical parts, electrical components and microprocessors. The word “mechatronics” itself is an integration of “mechanics” and “electronics.” The major difference between conventional machinery with electronic components and mechatronic machinery is that the former adds electronic components, while the latter integrates electronic components. By integrating electrical components and microprocessors into the machinery, the machinery is responsive to the operating conditions and results in programmable and “intelligent” machinery. It’s a case where the sum is greater than its parts.

Department research projects in the mechatronics area include automated in-field machinery guidance, intelligent safety control for off-road equipment and programmable electrohydraulic valves.

The automated in-field machinery guidance research project is co-sponsored by Illinois C-FAR, UIUC Research Board and Case Corporation. It relates to development of automated navigation control technology for agricultural tractors and combines via electrohydraulic steering systems. It uses a multi-sensor guidance system for providing guidance signals to automatically navigate a tractor or combine traveling on agricultural fields and performing various agricultural operations. The lack of skillful operators, the aging of the farm labor force, and the application of new agricultural technology make automated functions on agricultural equipment of commercial significance and societal importance. This research intends to address challenging technical problems of the perception of confusing guidance information, identifying and compensating for steering disturbances, and developing high



*Qin Zhang, Assistant Professor
Off-road Equipment Engineering*

performance electrohydraulic steering control systems. Prototypes of an automatically guided tractor and combine with a multi-sensor navigation system and an electrohydraulic steering system have been developed. Advanced sensor fusion, navigational control, and steering control algorithms are under development and will be evaluated on the prototype machinery.

The intelligent safety control project for off-road equipment is sponsored by NIOSH. This research will address the specific topic of intelligent safety sensing and control for off-road equipment. Off-road equipment is designed to perform operations while in motion. This often results in an unsafe work environment around the equipment for human-machine interaction. The hypothesis of this research is that an occupancy and motion detection sensing system will detect the presence of humans or other equipment and indicate the position and



One of the new labs.

motion of the object relative to the operating equipment. A safety measure of the identified object can be estimated according to the distance and position relative to the pathway of the equipment and the moving trajectory of the implement on the equipment. The entire surrounding area of the operating equipment will be classified into different zones of safe, warning and danger. A safety assurance algorithm will create a control signal to allow full rate, reduced rate, or no operation based on in which zone an object was detected. This safety control signal will override all other automated operational functions. A prototype of the off-road equipment safety control will be developed on an agricultural tractor platform and evaluated in agricultural operations.

Programmable electrohydraulic valve research is sponsored by the National Fluid Power Association. The programmable electrohydraulic valve is a mechatronic "soft" component integrated by electronically actuated hydraulic valves and a computing unit. It can realize various definite functions according to programmable control logic without modifying the hardware. This makes such a component easily adaptable to different applications and results in simpler machine systems. This technology has allowed entirely new classes of machinery or machine components to be created. Some of the major challenges in making such advanced technology applicable include developing new theories and methods for programmable valves and the creation of new apparatus

through integrating hardware and software. The research objectives are to design a "programmable" valve with multiple functions and to study the theories and methods for designing such valves. The core of this technology is control logic, which consists of signal processing, function identification, and control reasoning. The invention of a mechatronic "programmable" valve leads to less components and high reliability on mobile electrohydraulic systems. It can also reduce the cost by hundreds to thousands of dollars on each machine. This technology can be applied to other components in many machines, and will bring significant technical and financial benefits to U.S. industries.

THANK YOU DONORS!

The gifts of alumni and friends fund student leadership programs, instructional resources, and offer many other educational experiences that extend beyond the classroom. Your gift will help to enhance the College's reputation as one of the top agricultural engineering programs in the country. We appreciate your continued friendship and loyalty and your support to the department is greatly appreciated. Thank you ...

Mr. Marvin G. Aden
 Mr. and Mrs. Gary L. Asher
 Mr. and Mrs. Richard Ayers
 Mr. Paul G. Boland
 Mr. and Mrs. Gene R. Brieser
 Mr. Maurice L. Burgener
 Dr. and Mrs. Richard G. Carlson
 Mr. Dana A. Christensen
 Ms. Elizabeth W. Christensen
 Mr. Ronald L. Clayton
 Mr. Roger W. Curry

Mr. and Mrs. Scott E. Davidson
 Dr. Floyd E. Dowell
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 Mr. David A. Kuhl
 Mr. Thomas D. Langstone
 Mr. Chris B. Lovekamp
 Ms. Jane G. Lovekamp
 Mr. Fred F. Manhart
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 Dr. and Mrs. John C. Siemens
 Dr. David W. Smith
 Mr. Daniel L. Smith
 Mrs. Shelby C. Smith
 Mr. and Mrs. Roger M. Smith
 Mr. Lyle E. Stephens
 Mr. Gary D. Uken
 Mrs. Janet S. Uken
 Mr. and Mrs. Jay J. Wait
 Ms. Phyllis K. Whitlock

ALUMNI HAPPENINGS ...

1950's/1960's

Richard A. Bengtson (MS '67) was awarded the 1999 Sedberry Award for Outstanding Undergraduate Teaching from Louisiana State University. He is a Professor of Biological Engineering.

Donald K. Fadden (BS '61) retired in January 1998 as Engineering Purchasing Manager of Truck Engineering for Navistar International Transportation Corporation in Fort Wayne, Indiana. Donald and his wife, Edna, will be celebrating their 39th anniversary in June and with their three children grown and "out of the nest," decided to build a retirement home and moved around the first of April. Donald indicated that all of his children graduated from college, however, none attended the U of I. But, he can report that two of them received their degrees in engineering. Donald and Edna have four grandchildren with the fifth expected this July. In retirement he is very busy with church activities, playing bridge and fishing. Donald is also a member of the Lions Club and the Gideons International. Donald also reports that he keeps in close contact with agriculture as each spring and fall he travels to Dixon, Illinois to help his brother-in-law plant and harvest.

Larry F. Huggins (MS '62/BS '60) is the 1999-2000 President of the American Society of Agricultural Engineers (ASAE). Larry is Associate Dean of the School of Engineering and Professor of Agricultural and Biological Engineering at Purdue University.

Wayne L. Peterson (MS '68/BS '66) informs us that he is entering his second year of retirement. Travel, community service and time with the grandchildren keep him busy.

At the 1999 Annual International Meeting held in Toronto, Canada last year the American Society of Agricultural Engineers (ASAE) presented the John Deere Gold Medal Award to **John C. Siemens** (MS '58), professor emeritus of our department, for outstanding accomplishments in teaching, research and extension work.

Mark D. Zimmerman (BS '63) sent us information recently on his current activities. For the last three years he has been at Lorain County Community College in Ohio as Director of Business & Industry Programming and Coordinator of Marketing Initiatives.

1970's/1980's

William L. (Lynn) Cazier (BS '81) began a new position with XYZ Positioning Systems LLC of St. Louis, Missouri in mid-August 1999. XYZ sells and services instruments for the construction and survey industry. Products include Laser Plane construction lasers, total stations, site work estimating software, and automated machine controls for tiling machines, dozers, scrapers, motor graders, and other construction machines.

In October 1999 **Elbert C. Dickey** (Ph.D. '78/MS '74/BS '70) was appointed interim dean and director

of the University of Nebraska's Cooperative Extension Division. Elbert is a professor of biological systems engineering and is a nationally recognized leader in conservation tillage education and earned the Great Plains Agricultural Council's Distinguished Service Award for conservation tillage.

Jim W. Donoghue (BS '81) was promoted in March to Vice President, North America, for the Case construction equipment business of CNH Global. Donoghue has 19 years of industry experience with Case, holding positions in engineering, manufacturing, product management, marketing and sales, and previously served as director of sales and rental, North American construction equipment.

At its 1999 Annual International Meeting held in Toronto, Canada last July, the ASAE presented the New Holland Young Researcher Award to **Bernard A. Engle** (MS '85/BS '84), a professor in the agricultural and biological engineering department at Purdue University, for his outstanding research contributions towards the use of information systems to solve problems involved in the areas of agricultural water pollution. The ABE Department at Purdue announced that Bernie was designated as a University Scholar based on his outstanding research program in geographic information systems and his excellence academic teaching performance.

J. Neil (Stevens) Jednoralski (BS '70) will appear in the special Millennium Edition of **Who's Who in America, Science and Engineering**, 5th Edition.

In September 1998, **Kenneth E. Litwiller** (BS '77) was installed as Pastor at Maple Grove Mennonite Church in Pennsylvania and continues to serve in that capacity.

Jay J. Wait (MS '73/BS '71) sent the following paragraph to us. *"I found the December newsletter quite interesting, but also somewhat sobering. With the articles on retirement of Professors Goering and Siemens, the imminent retirement of Professor Mitchell, and the recent death of Professor Butler, turnover may now be complete since I left the University in 1973. But even without the people I knew, and with the new building the department has now occupied for quite a few years, it will still be my college "home."*

1990's

The next generation Ag Engineer ...

Jared Thomas Abbott

Jason and Julie (Beveridge) Abbott (both BS '97) want to announce the birth of their son! Jared Thomas was born October 3, 1999 in Peoria. Jared weighed in at 6 lb. 15 oz. and was 19½ inches long. Julie recently "retired" from Morton Buildings to stay home with him. According to his proud parents, Jared is a wonderful baby!



Bret A. Aukamp (BS '93) brought us up-to-date last December on his activities. Bret works in Oregon for Northwest Youth Corps each summer and occasionally in the spring and fall. During the wintertime he works as a substitute teacher at the high school level and enjoys taking on longer teaching assignments. In fact in May of 1999, Bret was named "Teacher of the Year" at one of the schools he substitute teaches at.

In February of this year we learned that **Allan E. Bautista** (BS '99) accepted a job transfer to NCSA's ACCESS Center, Alliance Center for Collaboration, Education, Science and Software. The Center is located in Ballston, Virginia in the DC metro area.

Gregory A. Boyce (BS '92) has been busy with family and work. Since graduation, he has been working for DeKalb/Monsanto in the seed production division and last April he transferred into the Seed Engineering group. In his current position of Project Manager, Greg manages updating and/or expansion seed production projects up to 30 million dollars.

Paul D. Brooks (BS '91) has joined the management staff of Plastipak Packaging, Inc. in Champaign, Illinois as customer service manager for consumer cleaning, health, and industrial PET and HDPE plastic bottles.

Kevin J. Gebke (BS '94) married Erica Barnes on June 20, 1998 in Dubuque, Iowa. They have two children, Alyssa (7 years) and Keegan (8 months). Kevin started with Frommelt Safety Products (Division of Rite Hite Corp.) in June 1999 dealing with their HVAC products.

Scott D. Hogan (BS '92) accepted a position with Baxter Healthcare, Round Lake, Illinois, as a Principal Engineer in process development. Scott has been on the job about 10 months and he really enjoys it. The job requires some traveling to places he didn't get to while in the Navy.

In August 1999, **Joshua P. Kempel** (BS '99) took a promotion to become Manager, Product Support Marketing for John Deere Construction covering the area of Arkansas, Western Tennessee and Northern Mississippi.

On May 22, 1999, **Mark E. Payne** (BS '99) married Christy Wilson. Mark is employed at John Deere in Iowa.

Matthew E. Rademacher (BS '96) and Theresa Thompson were married earlier this year. Matt is employed by NACCO Materials Handling Group in Danville, Illinois as a design engineer. The couple, who reside in Urbana, is planning a wedding trip to Niagara Falls this summer.

Gary F. Sierens (BS '99) married Beth Kuster on November 13, 1999 in Kewanee, Illinois. Gary is employed with John Deere Harvester Works in Silvis.

An August 12, 2000 wedding is being planned by **Craig S. Snyder** (BS '97) and Jamie Wieland. Craig graduated with a degree in environmental engineering and is the owner of Snyder Environmental.

Karl W. Scherer (BS '98) and Colleen Strunk were united in marriage on May 22, 1999. The couple will be making their home in Champaign, Illinois.

Coming in the next Issue ...

- J. Kent Mitchell's Retirement
- Department's New Millennium Look
- New Faculty
- Much More

Coming in the September Issue!
Don't miss it!

In Memory ...

John W. Mattingly (BS '48) of Loveland, Colorado, died December 8, 1999 in St. George, Utah. Mr. Mattingly served in the U.S. Navy Air Corps during World War II. He was a PB5 amphibious plane pilot and patrol plane commander. He moved to Fort Collins in 1949. He owned Health Engineering, where he designed an oxygen cutting tool for industrial use. After selling Health, he joined the faculty of Colorado State University where he taught in the engineering department for three years.

A dentist friend challenged him to create a device to help improve oral hygiene. He then invented the Water Pik and went on to found one of Fort Collins' first cornerstone industries, Aqua Tec (now known as Water Pik Technologies).

Mattingly retired from the business world in 1968 and opened a soaring ranch where he enjoyed many years of flying along the Front Range. After moving to Loveland in 1983, Mr. Mattingly pursued many other interests, including writing and research.

He is survived by his wife Frieda, three sons, a sister and three grandchildren.

Moving, changing jobs, new happenings ... Let us know

Name: _____

Company Name: _____

Home Address: _____

Home Phone (w/area code): _____

Comments:
