Team Gives Basic Research Some Absorbing Applications
In the past few months the College of Engineering has experienced a number of major events that will have lasting effects. Several of these events are discussed in this issue of Iowa Engineer. Let me tell you about some others.

A new University provost

As soon as Mary Sue Coleman arrived on campus late last year as the University of Iowa's 18th president, she began to change the direction of the institution. Results of her encouragement and direction are already evident. Most recently, Coleman's selection of Jon Whitmore as the University's new provost was approved by the State Board of Regents. Whitmore, a distinguished scholar and administrator, comes to Iowa from the University of Texas at Austin, where he was dean of the College of Fine Arts.

As a member of the provost search committee, I enjoyed having the rare opportunity to learn a great deal about Whitmore's knowledge and appreciation of technology. Together with President Coleman, our new provost will provide strong leadership for faculty and staff involved in the University's teaching, research, and service missions.

High-ranking student talent

Our students continue to bring top-caliber academic talent to the College. Among the benchmarks that measure our entering freshmen's success is the share of Presidential Scholarships they win. For the coming academic year, the University has awarded seven of its twenty-two Presidential Scholarships—more than 30 percent of these prestigious awards—to new College of Engineering freshmen, who represent just slightly over 6 percent of the University's entire freshman entering class. This year's seven College of Engineering winners are all from the state of Iowa. Five of them are enrolled in biomedical engineering and two in electrical and computer engineering. Three are men and four are women. Most impressive: Five of the seven were ranked number one in their high school graduating class.

New facilities for high aspirations

We recently passed two major landmarks on our path toward obtaining facilities that better match the quality of our students. First, in May the Iowa State Legislature approved a $14.14 million request for the first major modernization of the Engineering Building in well over 30 years. Iowa governor Terry E. Branstad signed the capital bill, elevating Iowa's already enviable reputation for supporting higher education.

Second, the State Board of Regents on June 19 approved the architects' preliminary plans for the building modernization project—plans that include space tailored to fit students' needs and to provide even greater opportunities for student/faculty interaction. The project architects now are authorized to develop more detailed plans to help the college achieve its goals. More information about the progress of this project is available in the story that begins on page 12.

In addition, we are delighted to have received notice of final federal and state support for the National Advanced Driving Simulator (NADS), the single largest research contract ever awarded to an Iowa Regents university. The simulator's prime contractor, TRW, Inc., already has begun construction plans for the $45-million project (see story on page 15).

Praise for faculty leaders

As you browse through Iowa Engineer, please take special notice of the story about this year's collegiate faculty awards (see page 11). The three recipients embody our faculty's longstanding devotion to teaching, research, and service. Not only are Professors Choi, Parkin, and Patel strong mentors for their students, they also reinforce the environment of high motivation in which their faculty colleagues work. We are fortunate to have such talented individuals at Iowa.

I also want to take this opportunity to thank the college's many alumni and friends who give their time and financial support to help make things happen here. A special expression of gratitude goes to Phil Francis (M.S. '60, Ph.D. '65), who took time from a very busy schedule to drive here from Chicago and then back on the same day—Mother's Day—to deliver the charge to our graduates at commencement. Without question, Phil sent more than 130 graduating seniors on their career paths with a clear message: "Keep up with rapidly changing technical knowledge and master the 'business' of business. Understand the forces that make business run and succeed.” Phil's energy level is well illustrated in this issue's alumnus feature, (see page 4).

As you can see, we have had a very eventful few months. Most of all, we enjoy the opportunity to keep you informed of the progress your college is making. We hope you are as proud as we are of the continued accomplishments of our alumni, students, and faculty.

/ Richard K. Miller
Dean, College of Engineering
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Renaissance engineer

STUDENTS on the brink of earning engineering degrees would do well to consider the career of Phil Francis.

“When I graduated with my master’s degree from Iowa, I decided my education was complete,” Francis says. “I knew what I wanted to do and I had my career mapped out.”

Little did he know that his education was just beginning and that his extremely successful career would take a series of unexpected but extraordinarily favorable turns. Now a client partner for the manufacturing industries practice at AT&T Solutions, in Chicago, Francis has woven into his career virtually every possible nuance of an engineering profession: research, teaching, management, manufacturing, business, and public service.

The son of a naval officer, Francis led something of a nomadic childhood, moving from one coast to the other every couple of years. In high school, he enjoyed math and physics and spent his free time fixing and rebuilding cars and designing engines.

“I saw a close connection between fixing cars and engineering,” says Francis, who today owns a restored 1962 Mercedes 190SL. “When I took college calculus, however, that connection quickly disappeared.”

He graduated from California Polytechnic State University with a bachelor of science degree in mechanical engineering and decided he wanted to attend graduate school in the Midwest.

“It was one place I’d never lived,” Francis says. “When I asked one of my professors where I could get a strong graduate education in the Midwest, he said, ‘Iowa.’”

So Francis packed up and came to Iowa City, where he fell in love with the large university in the small town. He also was impressed that Iowa was one of the few schools in the country that would allow him to pursue his interest in the philosophy of science while also earning his engineering degree.

“I’ve always been intrigued by the relationship between technology and society and in how we put our technology to use,” says Francis, who also took a number of courses in the School of Religion. “It’s important for engineers and other scientists to place their work into some larger context.”

Francis, who delivered the spring ‘96 graduation address, often encourages young engineering students to broaden their intellectual horizons to include the liberal arts.

“You might be a great engineer,” he says, “but unless you understand the underpinnings of history, philosophy, and current events, your world view is going to be very narrow. Iowa has a tough engineering curriculum, but it still accommodates people who want to explore other areas of knowledge.”

Two teachers at Iowa took a particular interest in Francis’ progress at two different points in his academic career. The first was mechanical engineering professor Royce Beckett.

“Professor Beckett was the finest teacher I ever had and a wonderful mentor,” Francis says. “From almost the moment I arrived on campus, he had me doing lab work, something that gave me a lot of confidence. He believed in me.”

Francis earned his M.S. in mechanical engineering in 1960. Convinced his education was complete, he moved to California and went to work as a stress analyst at Douglas Aerospace.

“I was young and fresh in technology,” Francis recalls, “so they moved me around a lot to different design jobs in different divisions. I learned quite a bit, but then they put me in the advanced research group, and I suddenly realized everyone was talking at a level of language I didn’t understand.”

Francis decided it was time to go back to school, so he enrolled in night courses at the University of California-Los Angeles and day seminars at Caltech. But with a young family and full-time work, he decided he didn’t have seven years to spend on part-time schooling.

And then out of the blue, Francis’ Iowa mentor, Royce Beckett, called one day to say that the College of Engineering had an opening for a graduate student who would be interested in a research assistantship.

“I couldn’t believe it,” Francis says. “We hadn’t been in touch for over a year.”

“I took the offer.”

While working toward his Ph.D., Francis
met the other Iowa faculty member who had a defining role in his life. Biomedical engineering professor Kwan Rim was new to campus when Francis arrived.

"I was assigned to be his first Ph.D. student," Francis says. "He was a tremendous teacher and guide, and through the years we've maintained a close friendship."

Francis' sterling academic career was recognized when he received the first NASA Fellowship ever offered through the College of Engineering. With the opportunity to study full-time, he managed to complete his doctorate in two-and-a-half years, graduating in the summer of 1965.

Francis maintains contact with several of his fellow Iowa engineering graduates, including James Ashton, John Denkmann, Jim Hurt, and Roger Stafford. And two years ago he enjoyed something of a reunion evening with a roomful of Iowa alumni.

"When I heard that Professor Beckett was retiring [from Auburn University]," Francis says, "I decided to gather up some of his old M.A. and Ph.D. students and surprise him.

Twenty-five people—all Iowa grads—came from Taiwan, from India, from all over the world to celebrate Professor Beckett's life and work. When he walked into the room, everyone just stood up and applauded."

When Francis completed his doctorate, he didn't go far from academia's intellectual life. At Southwest Research Institute, a think tank located in San Antonio, Tex., he devoted 14 years to tackling basic problems in research and design of materials behavior, fracture, and fatigue. While there, he published some 60 papers, edited two technical books, and wrote Principles of R&D Management.

He also served two elected terms on the city council of his suburban township and managed to earn an M.B.A. at nearby St. Mary's University, specializing in management.

"At the institute, I had been promoted to the position of manager," Francis says, "and I suddenly realized I didn't know the first thing about accounting, marketing, or organizational behavior."

Francis says there is a critical need for more excellent engineers who understand today's business world. In a keynote address to a recent MIT engineering conference, Francis called for better integration of such knowledge in engineering college curricula across the country.

"Most engineering programs continue to be too conservative, too much like they were a generation ago," he says. "Many students think that the engineering division of a company leads the decision-making process. That's a very distorted view. While engineers are of course important, they must understand their role as part of an integrated operation, perceive how their particular business organization functions, and appreciate the role of the customer in company decision making."

Francis stresses that education about such issues can be achieved without dismantling and restructuring current curricula at engineering colleges.

"Teaching students how industry works can be integrated into each class," he says.

He adds that familiarity with entrepreneurial opportunities is another important facet of learning about contemporary private sector opportunities for engineers.

"Eighty percent of new engineering jobs are in small new companies," he says. "Big companies just aren't hiring right now, and in fact, many are laying off professionals. That's a big difference from when I graduated."

His commitment to engineering education led Francis to make another life-changing decision in 1979.

"I decided I wanted to indulge my interest in academics, so I accepted a job at the Illinois Institute of Technology."

Despite the fact that Francis himself had been a graduate student when he last taught university students, the IIT offered him a professorship, chair of the mechanical and aerospace engineering department, and full tenure. The offer was testament to his considerable abilities and reputation both in technical engineering and in business management.

Another lightning bolt

One day, after five enjoyable years in academics, Francis was struck by "another bolt out of the blue."

"I was walking across campus," he says, "and suddenly I was asking myself, 'What do you really like to do that's fun and of ultimate value?' I began to wonder what I could do to affect society in some more direct way."

Francis says that in the space of five minutes, he decided again to shift his career focus and to explore the world of manufacturing.

"I didn't know anything about manufacturing," he says, "but my educational and professional background was consistent with such a career. For a year I was a closet student, reading everything I could get my hands on about manufacturing tools and techniques, and about the players and the issues in the field."

In the process, he also introduced manufacturing robotics into the curriculum at IIT. Once Francis had developed a new network of relationships with the people and professional organizations in manufacturing, he took the plunge and changed careers.

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Phil Francis

Continued from page 5

“It was one of the smartest moves I ever made,” he says. “I loved teaching, but I didn’t like the fact that in academics you often can’t get things done quickly.”

Francis landed a job with a new start-up company called Industrial Technology Institute, where he helped client manufacturers improve their performance. After two years at the institute, he was hired as the director of advanced manufacturing technology at Motorola Corporation.

“At Motorola I was able to get involved in the details of the manufacturing process,” Francis says, “especially in the electronics and communications industry. It was a wonderful job, and I fully intended to stay, but then...”

Still on the move

Francis got a call from Square D, one of the largest manufacturers of electrical control equipment in the world. Despite strong loyalty to Motorola, Francis decided to seize the day and become a part of senior management.

Francis spent six years as a vice president and chief technology officer at Square D. But in 1994, after “something of a hostile takeover” of Square D by an international company, Francis decided that the company had become too conservative, and decided to leave.

“A new CEO came in with a different agenda,” Francis says. “The company was told to ‘stick to the knitting,’ and there was little investment in developing new technology.

“In this economy, you have to grow to survive,” he says. “We were hanging onto our market share, making minor enhancements to the fine products we already had. But there was little vision about where we could go with new products or new markets. There was no value placed on breakthroughs, nothing to shatter the paradigm.”

Francis adds, “Views differ on how to run a company successfully. Although I disagreed with Square D’s new management, we parted on good terms and with mutual respect.”

At AT&T Solutions, Francis has found a setting that nurtures his interests and talents. He leads a management consultant staff that advises corporations in the Global 2000, companies that have annual sales of more that two billion dollars.

“Whoever our clients are—manufacturers, retailers, banks—we help them reorganize, restructure, become more efficient, get closer to their customers, and better manage their suppliers,” Francis says.

Among Francis’ clients are large auto makers and a major Korean manufacturing firm.

Despite his hectic life, Francis finds time to spend with his wife and four grown children and serves as a major fund-raiser for the March of Dimes in Chicago. He is finishing a book about managing product and process technology and until recently edited the technical journal Manufacturing Review, which he founded in 1987.

He also maintains strong ties to his alma mater. For four years, Francis served on the College of Engineering Advisory Board and currently sits on the Development Council.

“I’m very excited about the future of this college,” Francis says. “Over the last few years, the school has set challenging but appropriate goals with measurable targets. Iowa manages to provide a very high quality education at all levels of instruction but does not try to emulate the huge research universities.”

And rightly so, Francis says, stressing that major research should not be the principal mission at Iowa, a school where excellence in teaching should remain paramount.

“I received a superb education here,” Francis says. “That’s been the key to my professional life. By every objective standard—standardized test scores, faculty research and writing, grants and awards—this school is among the leaders in the country.

“And there’s no reason why it should be such a well-kept secret.”

“I am extraordinarily pleased that the college has seen fit to establish the academy...that not only allows us to point out the achievements of our graduates, but it also lets our current students know what might be in store for them.”

Mary Sue Coleman,
University of Iowa president, at the Distinguished Engineering Alumni Academy induction ceremony

Top: Darrell Wyrick (B.S.Ch.E. ’56), Frank Chrencik (B.S.Ch.E. ’37), and Shirley Wyrick chat at the Donor Recognition Dinner, held February 23 at the Athletic Club.
The week began with fanfare and ended with a warm welcome. Full-page advertisements in The Des Moines Register and The Cedar Rapids Gazette heralded the beginning of National Engineers Week, February 18-24. The ads recognized the contributions of engineering to the state of Iowa, including the education of more than 5,000 undergraduate engineering students at The University of Iowa and Iowa State University.

Together, the state universities' two engineering colleges celebrated engineers and engineering. "The positive impact of both engineering colleges being partners in this event was remarkable," said Richard K. Miller, dean of the UI College of Engineering. "It proved without question how the two colleges complement each other in delivering high quality education and research and helping stimulate solid economic growth at the same time."

In a unique whistle-stop tour of the state, Miller and James L. Melsa, Iowa State's engineering dean, spoke to schoolchildren, visited mayors and chambers of commerce, and toured a number of Iowa companies, including Pella Corporation, Deere & Company, Maytag Corporation, and ALCOA.

The duo also spoke at the Cedar Rapids and Muscatine chapters of the Iowa Engineering Society. In Iowa City, Melsa toured the Iowa Driving Simulator, the ice research facilities, and the salmon research laboratories.

On Wednesday the college held a special seminar on recent research and research trends at NASA. The featured speaker was Iowa alumna Pearl Cheng, deputy chief of the space projects division, NASA-Ames Research Center.

Following Cheng's talk, Frank Lin, project engineer at GM Safety and Restraint Center/Crash Evaluation, presented the 1996 Caterpillar Lecture. Lin spoke on the engineer's role in car safety and crash evaluation. The talk was sponsored by the college and the Biomedical Engineering Student Society.

At a Friday night dinner, members of the College of Engineering Donor Recognition Clubs were honored.

"This was a wonderful opportunity for the college to show its appreciation to its most generous alumni and friends," said Rich Wretman, director of development for the College of Engineering. "It was our first evening like this, and the feedback was very positive. We hope to do it again in the future."

The dinner, held at the University Athletic Club, was attended by Dean Miller, faculty members, engineering student leaders, and University of Iowa President Mary Sue Cole-

man. The inductees to the college's Distinguished Alumni Academy also participated in the event.

The week-long celebration was capped by a Saturday morning breakfast welcoming the charter members of the Distinguished Engineering Alumni Academy. Before a large crowd of family, friends, and members of the University community, the 18 Iowa graduates were introduced and presented with certificates.

The ceremony was hosted by Theta Tau National Professional Engineering Fraternity. President Coleman presented the keynote address, in which she emphasized the contributions of the distinguished engineering alumni and underscored the superb educational opportunities offered by the College of Engineering.

"As entrepreneurs, philanthropists, corporate executives, and community leaders," Coleman said, "these individuals reflect our college's commitment to human and social values as well as technological excellence."

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Who Will Be Inducted Next Year? Nominations Are Welcome Now

Induction of the first Distinguished Engineering Alumni signals the beginning of an annual event designed to recognize the superlative achievements and impressive contributions of Iowa-educated engineers.

The college administration welcomes nominations of individuals who have maintained a close association with the College of Engineering and have substantially contributed to their profession and to society.

The 1997 inductees will be honored during National Engineers Week, to be held in February 1997. That event should be especially memorable since it will occur during the The University of Iowa's sesquicentennial year.

In order to be nominated, individuals should meet the following criteria.

- They must hold an engineering degree from The University of Iowa, maintain a close association and supporting role with the College of Engineering, and be living at the time of selection.
- They must have made distinguished contributions to the theory and practice of engineering or demonstrated major accomplishments or guidance in emerging fields of engineering technology.
- They must have managed or directed an organization that has made noteworthy national or international contributions in design, construction, production, or service delivery through application of complex engineering principles.
- They must have contributed exceptional service to their community and to the College of Engineering.

Complete nomination information should be sent in letter form to the college's award selection committee. Nominations should include as much of the following information as possible.

- Name, title, address, and telephone number of nominee
- A list of noteworthy accomplishments
- A record of professional experience, especially extraordinary and unique contributions
- Principal technical society memberships and activities
- A list of noteworthy public service accomplishments
- "Seconding" letters of recommendation and support
- A list of awards and their selection criteria
- A résumé, including important contributions, publications, and patents

Nomination materials should be sent to Distinguished Engineering Alumni Academy Selection Committee, The University of Iowa, 3100 Engineering Building, Iowa City, IA 52242-1527. Nominations are due by September 15, 1996.
It may take a chemical engineer to tangle and untangle the complex chemical strands that form synthetic polymers, but any new parent will understand their potential significance: Super Diapers.

Two chemical engineers at The University of Iowa—both of whom have babies—are researching some unique and intriguing chemicals that may prove to have a wide variety of commercial applications, including better diapers.

“Dave Rethwisch [professor of chemical and biochemical engineering] and I got together one day and said, ‘How can we combine our expertise to try something new?’” says Jonathan Dordick, professor and head of chemical and biochemical engineering. “We basically just brainstormed, and this is what we came up with.”

“This” is a sugar polymer—essentially a very long sugar molecule—that is created with enzymes.

“A polymer molecule is made up of many repeated units in a long chain,” Rethwisch says. “In fact, a bowling ball is a single, very large polymer molecule.”

Rethwisch and Dordick are the first to use enzymes to create sugar polymers.

“We’ve been extremely gratified with how it’s all worked,” Rethwisch says.

And rightly so. Their efforts not only have produced some “neat things,” according to Dordick, but also have caught the eye of a number of industries. The University holds patents on two substances produced by the team, and a patent is pending on a third.

While Rethwisch provides expertise on polymers and Dordick on enzymology, a
third member of the team, pharmacy professor Robert Linhardt, sorts out the chemistry of sugars. Several graduate and undergraduate students assist in the lab.

Although most polymers easily dissolve, the Dordick/Rethwisch/Linhardt version actually absorbs water. And lots of it. The superabsorbancy of these synthetic substances, known as hydrogels, makes them very attractive to diaper-users' parents.

"In the lab we've managed to get the hydrogels to absorb 1,000 times their dry weight," Rethwisch says. "The mechanical properties of the material, however, leave something to be desired. The molecule must be strong enough not to fall apart but also retentive enough not to mush up and release all the moisture again."

Engineering refinements

To protect diaper consumers and others from such a horrifying possibility, the Iowa team is exploring the possibility of a different hydrogel configuration. Rethwisch compares the molecular properties of this improved version to a basketball: a structure whose tough outer skin nevertheless can absorb water within.

The hydrogel's unique structure may be the key to some intriguing and commercially viable applications, including biodegradable diapers and drug delivery implants.

Because sugars degrade in a compost heap or landfill, diapers made out of sugar-based hydrogels could solve a serious environmental problem.

"One percent of landfill in the United States consists of disposable diapers," Linhardt says. "If we could make diapers out of hydrogels that were 90 percent biodegradable, we could make a considerable impact on the environment."

At the moment, Rethwisch says, the molecules developed at Iowa are not truly biodegradable because although exposure to natural forces would decompose the sugars, 20 percent of the chemical—mostly carbons—would remain. The Iowa researchers are continuing to study their molecule's structural arrangements to refine its biodegradable properties.

Rethwisch, Dordick, and Linhardt also are investigating the hypothesis that the hydrogel can be implanted in the human body without being rejected. Such long-term biocompatibility would make the hydrogel extremely useful in solving a wide array of medical problems.

The researchers suspect that the body's immune system would recognize the sugar molecules that spiral around the outside of the polymer. Rather than reject the hydrogel as an intruder, the body would simply ignore it.

The medical possibilities of such a "biotransparent" molecule are intriguing: one of the most exciting potential applications is delivery of pharmaceuticals into the human body. The molecules could carry the drugs into the body without being attacked as intruders by a patient's immune system.

Linhardt, Rethwisch, and Dordick foresee a day when their hydrogel will improve controlled timing of drug delivery to the body.

"Say you attached the drug to a hydrogel molecule," Linhardt says. "As long as that molecule was still intact, the drug would remain attached. But when the molecule degraded, when its molecular links were broken, the drug would be released to be dissolved into the tissue."

In other words, pharmacists could control the release of the drug by unwinding the hydrogel's molecular links.

Options for healing

The three researchers see a number of possible applications for such a system, including drug implants and topical applications to a wound.

"At several levels," Linhardt says, "this is very much an engineering problem. In fact, dressing a wound with the technique could be seen as assembling a kind of scaffolding above the wound to continuously deliver a healing drug—like engineering a bandage."

In addition, the researchers have found that while current disposable diapers on the market absorb more distilled water and less urine, the novel Iowa material absorbs the two liquids equally well.

In the course of analyzing the hydrogel's molecular structure, the Iowa trio has discovered a number of exciting features of their so-far nameless molecule.

"It's stable to at least 70 degrees Fahrenheit," Rethwisch says, "and we have yet to find any enzymes that will break it down. On the other hand, it will eventually degrade—we think by losing some of its sugar molecules."

Thus, while the molecule can be stable long enough to deliver drugs to a patient, it also will break down in the natural environment.

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Miracle Molecules, continued from page 9

ment. It is this unique combination of biocompatibility and biodegradability that make it at once intellectually intriguing to the Iowa researchers and economically tantalizing to industries.

A number of companies, including one of the two leading diaper producers in the country and several pharmaceutical companies, have expressed interest in the research. While “super diapers” made with the Iowa synthetic polymer would provide considerable relief to parents as well as environmentalists, use of the material in drug-delivery systems could make a significant economic impact on the multibillion-dollar worldwide pharmaceutical industry.

“Of course, we’re a long way from actual implementation for medical purposes,” Rethwisch says. “Even after a new substance is thoroughly researched in the lab, it must undergo rigorous human subject testing before being approved by the federal government for use by the public.

“At this stage,” he adds, “we have a very intriguing material, and we don’t exactly know what it will be good for. We tend to think, however, that a number of uses exist, and if they are all patented, the University will do very well.”

When asked what imaginative uses he foresees for the polymer, Rethwisch laughs and says, “We’re engineers. The idea of drug delivery systems is about as wild as we get.”

He, Dordick, and Linhardt, however, do daydream about several practical applications of the research, including moisture-retaining biodegradable “carpets” for farms and gardens, fully biodegradable utensils that can be eaten after picnics, and slick surfaces to keep barnacles off ships and gunk out of your drainpipes.

The latter idea led them to consider the possibility of creating artificial arteries to prevent blood clots from sticking. Until the trio has strengthened the material, Linhardt, for one, will remain skeptical.

“At this point,” he says, “trying to get blood that is under pressure from the circulatory system to flow through a tube made of hydrogel would be like using a garden hose made of Jello.”

A critical ingredient

Funded by the Iowa Corn Promotion Board, the project has been focusing on corn-based sugars, which the researchers predict will prove more successful than other, longer kinds of sugar molecules.

“For the state of Iowa, the potential economic benefits of this research are considerable,” Rethwisch says. “We estimate that the manufacture of an absorbent and biodegradable diaper using this substance could require as much as 20 million bushels of corn every year.”

To sleep-deprived parents, superabsorbent diapers made of corn-based molecules just might be worth their weight in gold.
Outstanding professors honored by colleagues

The talent and dedication of three engineering faculty members were showcased at the college's Faculty Awards Luncheon, held April 30.

The college presented its Faculty Research Award to Virendra C. Patel for his contributions to fluid mechanics. Patel, professor of mechanical engineering, also directs the Iowa Institute of Hydraulic Research.

"V.C. Patel is outstanding in all his academic endeavors," said Jacob Odgaard, associate dean for research. "He consistently meets high standards of excellence in his research, which focuses on aerodynamics and computational fluid dynamics. In recent years he has proven himself a true leader in his role as the institute's director."

Patel, who has been teaching and conducting research at Iowa since 1971, was instrumental in helping to establish the University's wind tunnel annex facility. He also has served as a consultant for many prominent international corporations and organizations, including Lockheed, General Motors, the National Bureau of Standards, and the United Nations Development Programme.

K.K. Choi, professor of mechanical engineering and acting director of the Center for Computer-Aided Design (CCAD), received the Faculty Service Award. Choi, who has been on the Iowa faculty since 1983, also has served as associate director of the center, responsible for coordinating large-scale research activities conducted by University faculty members and industry researchers.

"K.K. works extremely well with students, clients, and his colleagues," said L.D. Chen, professor and chair of mechanical engineering. "Because of that, he has provided a critical link between the University and industry to implement the computational methods developed here."

Choi, whose expertise includes mechanical system analysis, design sensitivity analysis, and optimal design, recently chaired the College of Engineering Strategic Planning Committee and the Engineering Faculty Council. He also has chaired several search committees for faculty and administrators and has reviewed proposals for National Science Foundation grants.

A third faculty member was recognized by the college and the University's Council on Teaching as a superb teacher and mentor. Gene Parkin, professor of civil and environmental engineering, received the Faculty Teaching Award.

"The department of civil and environmental engineering is committed to providing high quality undergraduate and graduate education," said department chair Forrest Holly. "and Gene Parkin is a marvelous example of this commitment."

Parkin joined the Iowa faculty in 1986. His expertise includes biological treatment processes, biodegradation of toxins, and the fate and transportation of contaminants in groundwater. He teaches courses in environmental chemistry, solid and hazardous wastes, and thermodynamics.

"Inside or outside of the classroom," says graduate student Sarah Christ, "Professor Parkin creates an ideal environment to nurture the minds of students and help them grow."

Lectures

Karl Lonngren, University of Iowa professor of electrical and computer engineering, presented the Iowa Distinguished Faculty Lecture in Engineering March 28 on the UI campus. Lonngren spoke on the nonlinear waves called solitons. The lecture was part of an ongoing University of Iowa-Iowa State University program designed to combine the best engineering education resources of both universities. The joint venture includes lectures, cooperative graduate courses, and faculty seminar exchanges.

On April 12, Anatol Roshko presented the Caterpillar Distinguished Lecture in Iowa City. Roshko, who spoke on the problem of turbulence, is professor emeritus of aeronautics at Cal Tech. He also was Dryden Research Lecturer for the American Institute of Aeronautics and Astronautics in 1976 and received the 1987 American Physical Society Prize in Fluid Dynamics.

Loading up on pain

Low-back pain was the topic this spring of a yearly symposium honoring a late associate dean of engineering. The Paul D. Schoiz Symposium on Technology and Its Role in Society, sponsored by the UI chapter of Tau Beta Pi, was held April 11 in Iowa City. It examined the question, "Can mechanical loads cause low-back pain?"

David G. Wilder, visiting associate professor of biomedical engineering and senior scientist at the Iowa Spine Research Center, was one of the featured speakers. Other speakers included Gunnar B.J. Andersson, chair of orthopedic surgery at Rush-Presbyterian St. Luke's Medical Center, Chicago, and Don Chaffin, professor of industrial engineering at the University of Michigan. James N. Weinstein, UI professor of orthopaedic surgery with a dual appointment in biomedical engineering, moderated the symposium.

Weinstein is associate director of the Iowa Spine Research Center.
During the last decade, Neumann Monson Architects has changed the face of Iowa City. The sleek art deco Mercer Aquatic Center and carpenter gothic addition to Trinity Episcopal Church are familiar local landmarks. In addition, the firm has made a striking alteration of The University of Iowa landscape with its stunning design for the new John Pappajohn Business Administration Building.

Now the members of the high-impact design group are turning their collective vision toward their next major project: modernization of the Engineering Building.

Last September Neumann Monson won a tough competition to design the Engineering Building renovation and addition. This spring, Iowa lawmakers approved $14.14 million for the building's construction.

Before prospective project architects from around the country even submitted their design proposals for consideration, college officials met with firm representatives. Kevin Monson, a partner in the 19-year-old Iowa City architectural firm and the project's principal architect, says his firm relied heavily on those discussions in designing its winning proposal.

"Before the members of the firm could even have an educated discussion about the project," Monson says, "we needed to understand the college's needs, goals, and visions. Dean [Richard] Miller, Associate Dean [Jacob] Odgaard, and Director of External Relations [Fred] Streicher were particularly adept at conveying the personality and uniqueness of the college. Working with them has been enjoyable, especially because of their student-oriented philosophy."

In addition to attending informational meetings, Monson and his associates toured each of the college's research and teaching facilities, including Iowa Advanced Technology Laboratories, the Chemistry Building, and the laboratories and offices at Oakdale Research Park. The tours gave the architects a preliminary view of the various teaching and research needs of each department in the college.

Monson stresses that the modernization project is very much a team effort. Working with Monson's group will be architects from the Los Angeles firm Anshen + Allen, specialists in designing science and technology buildings. The California firm designed the college of engineering building at the University of California–Riverside, for which it won an American Institute of Architecture Honor Award, and the genetics research center currently in design for Oxford University.

Anshen + Allen staff on the Iowa project will be led by Peter Stazicker, managing principal of the firm's Los Angeles office.

The team designing the Iowa building also will include two structural engineers from Jack Miller & Associates (Cedar Rapids), six to eight mechanical and electrical engineers from Alvine & Associates (Omaha), and several research facility designers from RFD (San Diego).

Since being chosen as the project architects, members of the team have devoted countless hours to learning even more about the community of people that study, teach, pursue research, and work at the engineering college. With the confidence of familiarity, the architects have begun the design process.

The project presents all manner of architectural challenges, not the least of which is how to dovetail the addition with the renovations of the existing facility. The college's location on the steep west slope south of the Pentacrest was not kind to the designers of the original building and its 11 additions and renovations.

"It's a difficult building to orient yourself in," Monson says. "There are so many levels, so many stairways and corridors. And depending on which door you come in, you can have a totally different sense of the building."

Or no sense at all. Most of the exterior doors open onto split-level stairwells, an abrupt and even confrontational first impres-
provide a more inviting, efficient learning environment as well as additional and more flexible research space. Although it is too soon to place an exterior image on either the renovated or new buildings, the architects have a good notion of major design elements that can accomplish this mission.

"One of the problems with the current building is that it offers no central space," Monson says. "Besides no front door, there is no core location where people can go to get a sense of what the building is about."

Stazicker adds that the engineering building can be more student-friendly. There is a need for spots where students can wait and chat between classes and "break-out" areas in which to sit comfortably and study.

"American architecture has a strong Jeffersonian tradition," Stazicker says, "whose ideal is to provide public spaces that foster the interchange of ideas as well as contemplation."

"Iowa's engineering college is very student-oriented," Monson says. "It's a small, personal school that prides itself on giving students individualized attention and offering them the opportunity to do things not possible in larger engineering colleges. The architecture of the building, however, needs to foster the college's strengths better."

Monson notes that another unusual strength of the college is the way it encourages students to partake of the broader University experience by pursuing their interests in the liberal arts and the humanities. Many undergraduates take courses in music, literature, religion, and history while earning their engineering degrees.

Monson's attention to student and faculty needs are hallmarks of his best-known campus project, the John Pappajohn Business Administration Building. Completed in 1994, the business school headquarters continues to elicit kudos for its design. The building—with its warm and elegant office and classroom spaces, delightful cafeteria, and accommodating auditorium—is in constant use by members of the University and Iowa City communities.

"It's getting heavy use," Monson acknowledges. "For me, that is very rewarding."

Monson, who earned his bachelor of arts degree in architecture at Iowa State University in 1973, has lived in Iowa City for 22 years and has a vested interest in maintaining and improving the architectural landscape of the local community. He notes that the not-yet-planned facade of the Engineering Building addition will be somewhat different from the face of the original 1905 structure. Nevertheless, he maintains, one of the most exciting aspects of the project is the challenge to unite the two parts in a functional and aesthetic whole.

"We have to tie together the two pieces," he says, "particularly in terms of how people can move through the entire building. Right now, if you want to go from the electrical engineering wing to mechanical, it's a long hike."

Seven minutes, actually. Preliminary plans include considerable lab space in the new wing to accommodate flourishing faculty and student research efforts.

Monson and his associates refined their focus on lab space after meeting with college faculty and staff, who presented the architects with work space "wish lists."

"We're discussing the possibility of constructing generic lab space that can be modified quickly and inexpensively to meet the evolving research needs of the college," Monson says. "At the same time, we must plan for moderate student and faculty growth and other future demands on the building."

Monson says that so far, the only real problem has been to fit the needs of the engineering community to a design that will be sharply constrained by a tight budget.

"We won't be able to renovate all of the old building," he says, "and in fact, we may be able to change only about 25 percent of it. While there is a real need to do more, we simply won't be able to make more extensive improvements given our budget. So the college and architects must continue to prioritize and to eliminate some things we would like to do."

Monson says that when designing a building, his firm does not try to create a signature style but carefully considers an array of elements, including the needs and desires of clients, the building's surrounding environmental context, and the larger fabric of the community's urban architecture.

The architect adds that the University maintains a high standard for its architectural persona and works diligently to create a sensible campus plan.

"To a large degree," Monson says, "the strength of architecture in this town is the University. The best architectural pieces being created right now are being built on campus.

"Buildings take their cues from their towns, their neighbors, and their users," he adds. "In the case of the engineering college, we will take all of those elements into account. Dean Miller is correct when he says the current building lacks a heart. We hope to give it one."

What's the story behind these dates and symbols? Alumni, students, faculty members, and visitors ask about the series of panels that wrap around the top of the Engineering Building. Each panel features a year, starting with 1906 (the year after the building opened) and ending with 1927. The years, sculpted or molded in relief, are paired with engineering icons such as a caliper, light bulb, bridge, and electric tower. If you can shed light on the significance of these panels, let Iowa Engineer know. We'll share your insight in a future issue.
Great scores!

Six College of Engineering Students were honored this year by the University’s Board in Control of Athletics for demonstrating academic and athletic excellence over the 1994-95 academic year. A gold medal was presented to Marc Roehl, graduate student in civil and environmental engineering, at the final men’s home basketball game of the 1995-96 season. Also honored were Mark Holtkamp, freshman in civil and environmental engineering from Fort Madison, Iowa; Marc River, junior in industrial engineering from Waterloo, Iowa; Chris Smyser, sophomore in general engineering from Naperville, Ill.; Dan Ross, junior in mechanical engineering from Cedar Falls, Iowa; Aaron Cotter, senior in chemical and biochemical engineering from Lincoln, Neb. Cotter is a three-time honoree.

The board presents scholarships annually to student-athletes who have maintained a cumulative grade-point average of 3.00 or higher (a “B” average) and have earned a varsity letter.

Commencement

Mothers of graduating College of Engineering students enjoyed an extra-special Mothers’ Day May 12, as they watched their son or daughter receive a diploma at the college’s commencement ceremony. Engineering alumnus Philip H. Francis (M.S. ’60, Ph.D. ’65) spoke to the graduates (see story on page 4).

Francis advised the graduates to be relentless in learning about the business environment, to have fun in life, and to remember that a graduate’s education is not over—rather, it is just beginning. He closed by saying, “Your dreams should always exceed your grasp.”

A total of 183 degrees were awarded: 134 B.S.E. degrees, 31 M.S. degrees, and 18 Ph.D. degrees.

The college presented a rose to each mother of a graduate.

Director’s Message

College benefits from advice of alumni and friends
And plans for a long-anticipated project

In the Spring 1995 issue of Iowa Engineer, we told you about the establishment of the College of Engineering Development Council. This group was convened by Dean Rick Miller to advise the college on a variety of important matters, including fund-raising. Chaired by Gary Seamans, the group has met on four occasions and has provided wonderful advice to the dean and the rest of us at the college. In addition to their deep interest as alumni and key friends of the college, the members also bring a great deal of business expertise to the table.

At the fall 1995 meeting, two new members joined the group, and I would like to introduce them to you. Tom Lowenberg earned a bachelor’s degree in civil and environmental engineering from the college in 1962 and a master’s degree from that same department in 1963. He is currently an executive with the 3M Company in St. Paul, Minn., where he has enjoyed a long and successful career. For many years Tom served as the primary liaison between the college and 3M. He also has served on the College of Engineering Advisory Board.

The other new member is Henry J. Meyer, of Amana, Iowa. Henry retired as CEO of Amana Refrigeration in 1991 after a 45-year career with the company. He has been a great friend of the University, having served in a number of advisory capacities. Recently he was a member of the UI College of Business Administration Board of Visitors. Henry has been very active in business in Iowa and is well respected by many leaders in the state.

These are exciting times for the College of Engineering. The Iowa legislature recently provided an appropriation to help fund the modernization of the college’s facilities (see story on page 12). This is a historic step for a building that was constructed at the turn of the century.

Because an important part of the project’s funding package will require private fund-raising, my colleagues and I at the University of Iowa Foundation have been very involved in planning for this aspect of the project. Grenzebach Glier & Associates, a well-known Chicago firm that consults on fund-raising, recently completed a fund-raising feasibility study for the College of Engineering.

The study produced very encouraging results and gave us considerable insight for planning a successful campaign. Nearly 50 alumni and friends of the college were interviewed during the study, and the overwhelming response was favorable. The consultants have concluded that a $6-million fund-raising campaign is indeed quite feasible, and they have recommended enthusiastically that the college undertake such a campaign.

In the next few months, the UI Foundation will work closely with the college’s faculty and staff to plan and develop a comprehensive campaign. In the early stages, we will work with a few of the college’s closest and most generous friends and alumni concerning the “advance gifts” portion of the campaign. We plan to initiate a more broad-based campaign for all alumni and friends in 1997.

I know all College of Engineering alumni are keenly aware of the need for an improved facility. We have waited many years for this opportunity, and with support from all engineering alumni, we’ll work to make it a great success. Your support, especially during the fund-raising campaign, will be more important than ever.

Rich Wretman
Director of Development
College of Engineering
Contest paves the way to start building NADS

The National Highway Traffic Safety Administration (NHTSA) has awarded a $34 million federal contract to TRW Inc., of San Diego, Calif., to build the National Advanced Driving Simulator (NADS) at The University of Iowa's Oakdale Research Park.

NADS, scheduled to be completed in 1998, will be the world's most advanced driving simulator. Its financing includes $5.7 million in building funds requested by the State Board of Regents from the Iowa legislature. NADS also will use computer software developed at the University and appraised by the federal government's General Accounting Office at more than $5 million, bringing the total project value to about $45 million.

The University of Iowa was chosen by NHTSA as the site for NADS in 1992, following a nationwide competition conducted by NHTSA and the National Science Foundation. The selection of TRW to build the driving simulator concludes a NADS design competition begun in February 1994.

NADS project director Edward J. Haug said the announcement means that the University's stature as a leading research institution in transportation systems and vehicle design will grow.

"This simulator will be orders of magnitude more powerful than any other in the world," Haug said. "The University hopes to receive National Shared-Use Research Facility status and should acquire a federal charter to conduct research in fields such as highway safety, intelligent transportation systems, virtual prototyping for vehicle development, and a broad spectrum of health and human sciences."

University of Iowa president Mary Sue Coleman hailed the announcement as a landmark for UI scientists.

"NADS will provide unique opportunities for interdisciplinary research," Coleman said.

David J. Skorton, vice president for research, called the decision "a tribute to the accomplishments of faculty and staff of the College of Engineering's Center for Computer-Aided Design (CCAD), who brought NADS to the University."

The precursor to NADS, the Iowa Driving Simulator (IDS), has been the site of a wide range of motion vehicle and vehicle operator research on the UI campus for several years. IDS will continue to be used heavily even once NADS is up and running.

Environmentalist speaks

A College of Engineering professor this spring became the 13th University of Iowa faculty member to deliver the prestigious UI Presidential Lecture. Jerald L. Schnoor, professor of civil and environmental engineering, spoke on "Eco-Logic: An Environmental Perspective for the 21st Century" at the February 4 event, emphasizing the links between development and environment and urging a pragmatic approach to environmental protection as the earth's population approaches six billion.

Schnoor, known worldwide for his research in water quality and environmental modeling, is a diplomat of the American Academy of Environmental Engineers. He has won many professional awards, including an Iowa Regents Award for Faculty Excellence and most recently, the Iowa Academy of Science Distinguished Fellow Award. His latest book, Environmental Modeling, will be published this year by John Wiley and Sons, Inc. Schnoor also holds a joint faculty appointment in the College of Medicine.

The Presidential Lectures were established by former UI president James O. Freedman to give faculty scholars a forum in which to present their research results to a broad general audience.

Scholarship honors alumnus

A new scholarship will help Iowa high school graduates who enroll in the College of Engineering, thanks to Marie T. Mascagni, a Clinton, Iowa, woman. Mascagni established the Vincent A. Mascagni Scholarship Fund in memory of her late husband, an international project engineer and consultant. The fund will provide awards of $750 to two students each year. Mascagni's gift was matched two-to-one by her husband's company, the Fluor Foundation, of Irvine, Calif. Both of the Mascagnis' sons earned bachelor's degrees from Iowa—Michael (B.S.E./B.S. in mathematics '81) and Peter (B.S. in political science '91).

Want the news, and fast?

The College of Engineering has a new way to share its news. E/WEEK, a weekly electronic newsletter, provides up-to-date information about general news, career services opportunities, honors, awards, lectures, and seminars. The newsletter already has many on-campus subscribers and welcomes off-campus readers as well. There is no charge to receive E/WEEK; anyone who has e-mail at home or at work can subscribe. To receive E/WEEK, just do the following:

• Send an e-mail message to: eweek-request@list.uiowa.edu (no subject line is required).
• In the body of the message, type "subscribe"; on the next line, type "end."
• Finally, send the message. You should begin receiving E/WEEK on Fridays.
Honor Roll

This honor roll gratefully acknowledges University of Iowa Engineering alumni whose generous 1995 contributions qualified them for membership in the College of Engineering donor recognition clubs. The clubs, whose members made high-level contributions in 1995 to the Engineering Development Fund and other college-wide funds, include the Dean's Club (annual contributions of $1,000 or more), the Transit Club (annual contributions of $500-$999), and the MECCA Club (annual contributions of $250-$499).

Other contributors, including spouses of alumni and corporate contributors, are recognized in the college's annual honor roll of contributors (published each fall) and in the University of Iowa Foundation's Annual Report on Giving.

Dean's Club

Transit Club

MECCA Club
Looking for a job?

Between career office and alumni, the help flows both ways

Engineering Career Services has a new look, from the remodeled reception area, recruiting rooms, and staff offices to the new nameplate on the director’s door. The changes are more than cosmetic—they reflect the college’s commitment to provide the best possible career services for its students and alumni.

“We’re here to help prepare engineering students for the world of work,” says Cathy Colony Bunnell, who began work as director of the careers office last December. “That involves much more than just helping them find a first job or internship.”

Bunnell emphasizes that career development is a lifelong process. Alumni as well as students need to assess their interests and abilities, explore career options, and develop and implement career plans. Bunnell and her staff encourage all engineering students and alumni to use the expertise and information available at the Career Services office.

“We’re here to serve,” she says, “and that’s something I want first-year students to understand from the moment they walk through the doors of the college on their first day.”

Bunnell would like to see a new requirement for students—a seminar that would help them understand the professional opportunities available to them and how their early decisions can affect those opportunities. Beyond the classroom setting, however, Engineering Career Services continues to educate students about becoming a professional. For instance, career services staff members present seminars on job searches, résumé writing, and internships and co-ops. They also conduct an orientation for students who are about to begin their co-op year.

“One of the things I’d like to start is an orientation session for students who are just getting interested in the co-op experience,” Bunnell says.

The new career services director also hopes to streamline the office’s record keeping, making it easier to retrieve data on where alumni land after graduation. That information will help the staff to understand its clients’ needs and to direct resources accordingly.

“At this point,” Bunnell says, “we don’t even know how many people use the office from year to year. We do know, however, that during fall and spring recruiting seasons we have students sitting on the floor and hanging on the counters as they read our materials.”

Many employers and alumni also use the office. Employers come to campus to recruit at Engineering Career Services, but they also rely on the office’s résumé referral service to recruit students and alumni long-distance. The office also helps employers seeking students for co-op and internship positions.

Bunnell emphasizes the vital link between the college and its alumni.

“Even young alumni can help Iowa students by providing information about their company, interviewing potential employees, and conducting practice interviews to give students confidence for the real thing. We also have some alumni who let students ‘shadow’ them on the job, spending anywhere from half a day to several days watching as the professional engineer works.”

Bunnell says alumni also use Engineering Career Services.

“They may decide they don’t like the job they’re in and want some guidance on where to turn,” she says. “We help them assess their interests, goals, and options.”

More often, however, Bunnell sees alumni who are interested in helping students launch their careers.

“It doesn’t cost alumni anything to share information,” she says, “and it allows them to remain connected with the college and its young people.”

The office is linked to the campus community through the weekly Job Bulletin, an online service produced by the Business and Liberal Arts Placement Office. Bunnell and her staff also provide career advice and information about job opportunities to E/WEEK, a weekly online newsletter produced by the College of Engineering (see story on page 15).

Although she and her staff are at the epicenter of career planning at the college, Bunnell reminds alumni of their important role in helping students develop successful careers.

“We’re available to help alumni in their own career searches,” she says, “but even more important, they have a lot they can offer to our students. Whether as informal mentors, co-op sponsors, or something in-between, our alumni can provide welcome support for students who are facing critical decisions about their educational and professional lives.”

Above: Cathy Colony Bunnell, director of Engineering Career Services, advises a student.
Imagine a robot that can walk. Its birdlike metal legs and backward-bending "knees" are reminiscent of the relentless Imperial Walkers in Star Wars. The robot's brains are housed in its body and can direct it to stop, lift its feet, and change direction. The ambulatory machine is designed to boldly go where no robot has gone before: across uneven terrain, even up stairs.

Now imagine that this device was designed by two high school students, and you'll understand the excitement generated by an ongoing partnership between the College of Engineering and an Iowa City high school.

Last year, Andy Urbanowski and Zoe Woodworth, seniors from Iowa City High School, researched robotics in Professor Andrew Kusiak's industrial engineering lab. Although they were unable to achieve their ultimate goal of designing and building the world's first successful walking robot, the two students nevertheless acquired valuable engineering knowledge and research experience.

"They set an impressive goal for themselves," says Kusiak, who stayed in touch with the students and their teacher throughout the year via e-mail. "The fact that they weren't able to reach that goal doesn't mean their effort wasn't rewarded."

Urbanowski echoes those sentiments. "It was a tremendous experience," he says, "one that I would recommend to any high school student."

Urbanowski heard about the program from Kevin Koeppnick, a City High School teacher who until recently taught the school's science research course. The course, which has been offered for some 30 years, is designed for talented seniors who have completed advanced high school science courses and who are inclined toward careers in science or engineering. Students receive both high school and University advanced placement credit for the course. Tuition is provided by the Iowa City School District.
Koepnick taught the science research course for eight years before opting to teach biology and environmental analysis.

"When I started we were placing only two or three students in University labs," he says. "We decided to step it up, and now we have about 15 gifted high school kids each year doing research there."

Through the years, Koepnick has forged strong ties with the College of Engineering, particularly through the University's Space Science and Engineering Program, sponsored by the Iowa Space Grant Consortium, the National Aeronautics and Space Administration (NASA), and the College of Engineering. Barry Butler, professor of mechanical engineering and campus director, has invited a number of Koepnick's students to work in his lab, as have Jonathan Dordick and David Rethwisch, both UI professors of chemical and biochemical engineering.

Koepnick has become acquainted with several engineering faculty members, so when two of his students expressed similar interests in robotics, he knew just whom to call.

"I started to give Professor Kusiak a hard pitch," Koepnick says, "but it wasn't necessary. He was immediately interested in helping both students."

Kusiak welcomed Woodworth and Urbanowski to the robotics lab and assigned graduate student Dean Jensen to be their adviser and mentor.

"Dean introduced them to the equipment and impressed upon them the need for thorough research," Kusiak says.

Urbanowski echoes that assessment.

"Dean made us really dig through the literature about robotics," he says. "I think we spent most of the first semester researching what other people had done before. At the time, I didn't appreciate it—after all, most high school students just want to jump in with all the parts and start building something."

Urbanowski says that now, after a year studying engineering at Iowa, he realizes why Jensen stressed the importance of doing preliminary research before launching into design.

"I understand better what real engineering is like," Urbanowski says, "and I'm grateful for the tremendous experience I got in the robotics lab."

After exploring previous research, Urbanowski and Woodworth brainstormed several design ideas. Then they drew up a 20-page proposal and presented it to Kusiak.

"I was so impressed with the talent, ambition, and enthusiasm of these two students," Kusiak says. "They came to me with a proposal that outlined the theory behind their idea and the design issues involved. They also wrote an excellent summary of the literature. But what really amazed me was the fact that they even included a business plan for how to fund their research and market their final design."

Urbanowski credits graduate student Jensen with the idea of formulating a business plan, which included an estimated budget of $500 and a list of sources for materials. He adds that although he and Woodworth exceeded their proposed budget, that too was a learning experience.

"And not only did they present me with a written proposal," Kusiak says, "two days later they came back with a prototype of their robot design."

The "prototype" was primarily Tinker Toys and string, but it served its purpose well. Although Kusiak recognized the enormity of the task Urbanowski and Woodworth had set for themselves, he gave them enthusiastic support and the green light to begin.

During the next few months, the two students immersed themselves in the world of computer-aided design.

"I got really familiar with Autocad, which I used to design all of the robot's parts," Urbanowski says. "Zoe and I originally went into the project with the idea that we'd just draw a sketch on paper and turn it over to the machine shop. We quickly learned that's not the way it works."

Urbanowski and Woodworth also learned to cope with unexpected delays, including waiting several weeks for a computer upgrade so that the computer they used could accommodate Autocad. Once the program was installed, the students worked and reworked various designs for the robot. When Urbanowski, Woodworth, and their mentors were satisfied, they submitted the design to the college's machine shop.

"Those guys are really great, too," Urbanowski says of the machine shop staff, who transformed his ideas into a different version of reality.

Although the robot's parts fit together well, the students encountered some difficulty getting their creation to interface with the computer.

"We pretty much had it built," says Urbanowski, who continued to work on the project throughout the summer following his senior year. "But unfortunately, we didn't have any way to power it up."

It is this challenge to forge links between the mechanical and the electrical that most intrigues the first-year engineering student. A self-described "take-it-apart-and-fix-it kind of guy" who chose engineering because he thinks it's fun, Urbanowski is studying computer technology precisely because it demands expertise in both electrical and mechanical engineering. It's a dual interest that he was able to explore during the two semesters he spent in Kusiak's lab.

The high school mentor program also challenges students to test their limits and to be creative, independent thinkers.

"I really emphasize to my students what a great opportunity this program is," Koepnick says. "Many of these talented students plan to take a challenging undergraduate program, one that includes calculus, chemistry, and physics. I tell them that one of the best ways to prepare for an engineering career is to become part of a research group—precisely what this program offers."

Koepnick adds that the students also learn about the team approach to research and come away from the experience with a new understanding and appreciation for what it takes to be an engineer. Some students also discover whether they are, in fact, interested and dedicated enough to pursue an engineering degree.

"It's valuable to learn early where your interests really lie," Koepnick says. "Although in any given year, as many as one-third of the students decide they won't pursue an engineering or science education in college, that realization also is a positive learning experience."

Indeed, the more telling statistic is that as many as three-quarters of the local students in the high school science research course do decide to pursue their passion for science and engineering after graduation. And Koepnick estimates that more than half of the students he has taught in the program have chosen to attend The University of Iowa.

"For the high school students, this course offers a hands-on introduction to engineering and a great opportunity to learn," Kusiak says. "The program also benefits the college. It's been a real eye-opener to the talent that exists in local high schools."

Kusiak adds that engineering faculty members have come to appreciate that talent and the educational system that develops it. In addition, faculty members who have been sponsors better understand the extent to which they must help young people, both high school and University students, pursue their interests and fulfill their promise.
1930s

William E. Cassidy (M.S. '34) lives in Longwood, Fla.

Earl R. Ewald (B.S.E.E. '34) writes that he was a pioneer in television engineering with RCA from 1934 to 1946. He set up two television tube manufacturing plants, one for Zenith and one for Crosley. He also set up special electron tube manufacturing for National Union Electrical Corp., Bloomington, Ill., where he was electronics department manager until his retirement in 1970. Ewald lives in Normal.

Samuel S. Oleesky (B.S.E.E. '35) was inspired by Iowa Enginner's list of "missing alumni" (Fall/Winter 1995) to write a letter reminiscing about his University of Iowa experiences. Oleesky reported that one of his classmates, Maurice Green (B.S.E.E. '35), died in the 1970s. Oleesky's long and varied career included work for Zenith Plastics (a 3M subsidiary), McDonnell Aircraft, the U.S. Army and Navy, Northrop Corp., Aerospace, and McDonnell-Douglas. He is the author or coauthor of several textbooks, editor of professional journals, and contributing columnist for The Wall Street Journal and Journal of Commerce. He invented and patented broad-band multilayer radome and found time to serve the Boy Scouts of America for 50 years.

Oleesky reports that he has 11 grandchildren and five great-grandchildren, is still over six feet tall, and weighs the same as when he was a member of the Iowa track team.

1940s

Joseph B. Davis (B.S.Ch.E. '49) retired in 1987 from Goodyear Tire & Rubber's chemical research and development department. He spent 35 years working in a variety of areas, including product development and customer technical service, emulsion polymers, applications in coatings, and adhesives and sealants (aqueous systems). Davis lives in Akron, Ohio.

William H. Parman (B.S.E.E. '49) retired in 1952. Although he must manage some ongoing health problems, Parman enjoys working with PCs, writing poetry, and playing guitar and singing at local convalescent homes. He lives in Oxnard, Calif.

1950s

Richard A. Bogue (B.S.C.E. '50) lives and works in Ida Grove, Iowa, where he is chairman of the board for First State Bank and president of Ida Grove Roofing.

Vern L. Petersen (B.S.E.E. '50) retired in 1985 after 23 years at Rockwell International. He also worked for Exellon Automation and Control Data. Hansen lives in Orange, Calif.

David C. Malm (B.S.M.E. '59) is an engineer for productivity and manufacturing in the defense industry for TASC, in Arlington, Va. Malm reports that he taught engineering at Iowa in 1965. He also has worked for Mason & Hanger-Silas Mason Co., Burlington, Iowa; Stanley Consultants, Muscatine, Iowa, and Washington, D.C.; General Electric, Evendale, Ohio; and at Boeing, Alton & Hamilton, the University of Maryland, and the Defense Intelligence Agency in the Washington, D.C., area.

1960s

Robert F. Scholl (B.S.Ch.E. '60) retired from Monsanto Co., where he was a general engineer. Since retirement, he and his wife have traveled in the United States and abroad, spending only about 50 days at home per year. Scholl writes that they are having a wonderful time and that he is grateful for the University of Iowa for preparing him for a wonderful career. The Scholls live in Pensacola, Fla.

1970s

Les Digman (B.S.M.E. '61, M.S.' 62, Ph.D in business '70) is on the University of Nebraska faculty, where he recently was named First Bank Distinguished Professor of Management. Digman directs Nebraska's graduate programs in management. His youngest son, Mark, will be a freshman in biomedical engineering at The University of Iowa this fall. Digman lives in Lincoln.

Richard B. Konzen (B.S.E.E. '61, M.S. '64, Ph.D. '70) is an associate professor emeritus at Texas A&M University. Konzen writes that he retired from the school's nuclear engineering faculty in 1993, after 23 years of teaching, research, and extension activi
ties and has given up most professional activities, including consulting. Now he is "having a fling at golf, fishing, hunting, and travel." Konzen lives in College Station, Tex.

Gary R. Harvey (B.S.E.E. '71) writes from Ramstein Air Base, Germany, where he is chief of intelligence for the Allied Air Forces Central Region of the North Atlantic Treaty Organization (NATO). Although he is not working as a professional engineer, Harvey reports, his engineering education at Iowa has kept him "ahead of the pack" in flight operations and development of stealth and other advanced technologies.

Harvey recalls Theta Tau fellowship, MCCARMA camaraderie, and the stone hunt and asks whether anyone remembers Doc's or the green cement shankroom at the College of Law.

Gary Seaman (B.S.E.E. '71) reports that his company, Westell, Inc., received the remote access product Best-in-Show Award at the Interop convention, held in Las Vegas in April. The award was made for Westell's Flexspac T1 ADSL Data Dial Tone. Seaman's, whose company recently issued public stock, was interviewed May 20 on the CNBC cable network. He also was profiled in the Fall/Winter 1995 Iowa Engineer.

Barry L. Boyd (B.S.C.E. '72) lives and works in Omaha, Neb., where he is president of Boyd and Associates Engineering Consultants. Boyd says he is still impressed with the quality of education at Iowa.

Quang Duong (B.S.C.E. '74) is a member of the technical staff at Lucent Technologies (formerly AT&T Bell Labs), in Whippany, N.J. Duong designs the enclosure of telecommunications systems—wire or wireless—and is responsible for rigidity of enclosure, heat transfer, humidity, corrosion, and so forth. He lives in Denville.

Felix Y. Pang (M.S. '74) lives and works in Hong Kong, where he is EDP manager of the ING Bank's Hong Kong branch.

James Kalina (B.S.M.E. '74, M.S. '76, M.S. '77) is an engineer at John Deere, in Waterloo, Iowa, where he has worked for 17 years. He reports that he has held several positions at the Waterloo Works, including seven years as an engineer in the environmental affairs and resources department. He now manages handling and disposal of hazardous water and on-site waste cleanup. Kalina and his wife, Lilly, have been married for 16 years and have a son and a daughter. Kalina enjoys gardening and home improvement projects, and sports.

James L. Bartlett (B.S.C.E. '77, M.S. '79) works at Town and Caldwell Consultants' home office in Pleasant Hill, Calif., where he is manager of the firm's mechanical/energy department. Bartlett has been with the firm for 16 years. He lives in Concord.

Michael Spear (B.S.E. in ChE '86) has joined Chrysler Corp. as a senior specialist in advanced manufacturing engineering, paint and energy management department. Spear previously worked six years for Du Pont. He works in Auburn Hills, Mich., and lives in Pleasant Ridge.

Kristin Schilling Hart (B.S.E. in ChE '87) lives and works in Madison, Wis., where she has been an air management engineer for the Wisconsin Department of Natural Resources since 1990. Before that, she was a fisheries volunteer in the Peace Corps, stationed in Guatemala. Hart was married in 1992 and had a baby boy last August.

Rajiv Rampalli (M.S.'89) lives and works in Ann Arbor, Mich. He is director of technical staff at Mechanical Dynamics, Inc.

Timothy S. Reid (B.S.E. in ME '89) works with Mercury Motors in Fond du Lac, Wis.

Karla Berkenpas (B.S.C.E. '80, M.S.C.E. '82) works as principal engineer for Philip Morris, in Richmond, Va. Berkenpas writes that she has completed an M.B.A. at Virginia Commonwealth University and recently was inducted into Beta Gamma Sigma, a scholarly honor society for business schools.

Payam Mavadatz (B.S.E. '82) recently was promoted to senior manager of wireless network planning for Northern Telecom, in Richardson, Tex. Mavadatz holds three departments involved in planning and deployment of PCS and cellular networks and services in North America and worldwide. He lives in Plano.

Edward Yu-Hsien Lin (M.S.'80, Ph.D.'84) is a professor and associate dean of faculty at the University of New Brunswick, Canada. He lives in Fredericton.

Larry Petree (M.S.'84) is senior product development engineer for COBE Cardiovascular, of Arvada, Colo., where he designs and tests new pediatric oxygenators and related perfusion systems. Petree lives in Conifer.

Rhett E. Livengood (B.S.E. in ChE '85) writes that he recently changed jobs and now is worldwide product marketing manager for CVD tungsten products at Novellus Systems, Inc., a semiconductor equipment manufacturer based in San Jose, Calif. Livengood lives in Santa Clara.

Kian H. Niu (B.S.E. in IE '85) lives and works in Springfield, Ore., where he is an engineer for Sony Disc Manufacturing.

Chris Rops (B.S.E. in CE '86) is project manager at HNTB Corporation, Chicago. Rops was chosen the Illinois Section ASCE Young Engineer of the Year. He also was named to a two-year term as director of ASCE's Illinois Section, through 1997. Rops lives in Aurora, Ill.

Scott Irvin (B.S.E. in EE '90) has earned an M.S. in engineering management at the University of Missouri-Rolla, completed his U.S. Air Force commitment, and accepted a position as systems control consultant with General American Financial, in Evansville, Ind. Irvin writes that he recently married Jill McKeever, a U.S. Air Force graduate from Freeport, Ill. The couple lives in Evansville.

Marty Stasi (B.S.E. in IE '91) is a manufacturing engineer with Donaldson Co. in Cresco, Iowa. Stasi lives in Oelwein.

Kevin J. Henrikson (B.S.E. in EE '92) lives and works in Cedar Rapids, where he is a computer programmer for Network Microdesigns. Henrikson reports that he writes software in C for insurance companies.

Naoki Mizuno (M.S.'92) is sub-chief at Chugoku Quality Control Lab for Nippon Hodo Co., Ltd., of Japan. Mizuno writes that he has worked at the company for four years, the first two as a researcher, developing computer-assisted landscape pavement design, and the last two as a quality control engineer, designing new heavy-duty asphalt mixture using large coarse aggregate. Mizuno lives in Osaka.

Ramesh V. Narang (M.S. '75, Ph.D. '82) is an assistant professor at Indiana-Purdue University. He lives in Fort Wayne.

Brian J. Sample (B.S.E. in EE '92) has relocated from Des Moines to Waukegan, Ill., where he is a development engineer for Cherry Corporation. Sample is responsible for hardware design of automotive electronics modules for new products at his company's automotive division.

Jaye Schweer (B.S.E. in IE '92) transferred in 1993 from South Carolina to Minnesota, where she is sales engineer for Culler Hammer/Westinghouse, in Minnetonka. She was promoted to outside sales engineer in 1995 and sells electrical switchgear. Schweer, who lives in Eagan, says she still enjoys watching Iowa beat Minnesota.

Rob M. Thomas (B.S.E. in IE '92) is an industrial design engineer for Omaha Standard, Inc., in Council Bluffs, Iowa, where he is in charge of new product design and manufacturing as well as facility layout for heavy-duty truck bodies. Thomas writes that after graduation, he went to work as a quality engineer and ergonomics consultant for a San Diego plastics manufacturer. But he decided to return to the Midwest to be closer to his family and friends. He lives in Omaha.

Marlon E. Kessy (Ph.D.'93) became senior water resources engineer in March for the Rosemont, Ill., firm Roxyne Engineering, Inc. Kessy, who previously worked with the Lake County (Illinois) Stormwater Management Commission, lives in Lake Villa.

Jennifer Heinzel Mathis (B.S.E. in IE '93) is a systems analyst for manufacturing software at the Brunswick Indoor Recreation Group, Muskegon, Mich. Mathis lives in Grand Haven.

Brian J. Albrecht (B.S.E. in ME '92) works at NTN Bearing Corp. of America, in Mt. Prospect, Ill., where in March he was promoted to applications engineer. Albrecht provides technical support for automotive and industrial customers. He lives in Winnebago.

All S. Ameen (B.S.E. in EE '92, M.S. '94) lives and works in La Crosse, Wis., where he is an electronic hardware engineer for the Trane Company.

In memoriam

Maurice Green (B.S.E.E. '35), 1970s

William D. Faick (M.S. '47), September 1, 1982

Clare Farley (M.S. '47), of Los Angeles, Calif., August 31, 1990

John C. Bell Jr. (M.S. '48), of Nashville, Tenn., March 1, 1992

William C. Peterson (B.S.C.H.E. '57), of Pekin, Ill., December 31, 1995 (see class note on page 20)

Mary V. Sheedy (former engineering dean's secretary), of Iowa City, September 19, 1995 (see story on page 22)
Remembering Mary Sheedy

Friends, faculty, and alumni of the College of Engineering were saddened by the September 1995 death of Mary V. Sheedy, engineering dean's secretary for 41 years. Sheedy, who retired in 1969, managed office work for five deans—Clement Clarence Williams, Byron James Lambert, Francis M. Dawson, Arthur W. Melloh, and Hunter Rouse—and for thousands of students. In fact, many alumni still attribute much of their college success to Sheedy's active concern and patient guidance.

"I went to Iowa after World War II on the GI Bill," says alumnus Thomas E. Daniels, "but about six months went by and the money still hadn't come, so I had to start working."

Daniels, who earned a bachelor's degree in electrical engineering in 1948, says that after earning several incompletes, he was called in to see Dean Francis Dawson.

"When I arrived, there was another student in Dawson's office," recalls Daniels, a charter member of the college's Distinguished Engineering Alumni Academy. "Mary Sheedy left the door open just far enough that I could hear the dean say, 'At engineering school, students have to do better than C work or they'd better go do something else.' I was some upset."

Daniels says Sheedy noticed his distress and told him, "I don't think you really want to see the dean today. Why don't you go home, and I'll talk with him. But if I were you, I'd quit work and concentrate on finishing those incompletes."

It was advice for which Daniels was forever grateful. He not only completed his course work and degree but also went on to a sterling career in space technology and space systems.

Sheedy was born in 1899 in Solon, Iowa. Raised on a farm, she attended St. Mary's High School in Iowa City, Irish Business College, and The University of Iowa. When she began working for the Office of the Dean—long before the computer age—the college had 300 students.

As a young woman, she cared for two elderly aunts, an act of kindness that one of her distant cousins says is the reason Sheedy never married. In fact, however, Sheedy had a very large brood of "children" to care for, counsel, and worry about. Her generous spirit and sage advice about which courses to take and what services were available influenced untold numbers of young lives. Twenty-seven years after she retired, her Christmas card list of former students swelled to 2,500.

In addition to her impact on students, Sheedy also touched the lives of faculty members and administrators. When she moved to Iowa City's Oaknoll Retirement Residence several years ago, one of the memorials she took with her was a painting done for her by the wife of former Dean Dawson.

Sheedy was buried at St. Bridge's Cemetery, Nolan Settlement, near her childhood home.
Mechanical Engineering

P. Barry Butler, professor, last November was named associate fellow of the American Institute of Aeronautics and Astronautics.

J.S. Chen, assistant professor, received the Excellence in Teaching Award from Hawkeye Engineer, the student engineering magazine, in March 1996. Chen also was nominated last fall for a University Faculty Fellow Award.

Enzo O. Macagno, professor emeritus, lectured on Leonardo da Vinci last December at the annual meeting of the Ente Raccolta Vinciana, in Milan, Italy.

V.C. Patel, professor and director of the Iowa Institute of Hydraulic Research, traveled to Germany, India, and Korea last October. During the trip Patel counseled with Samsung Heavy Industries Research and Development Center on design of a 1.2-meter cavitation tunnel. In addition, an agreement was signed for a cooperative exchange program between the Iowa hydraulics institute and the Advanced Fluids Engineering Research Center at Pohang University of Science and Technology.

Sharif Rahman, assistant professor, last November received a Battelle Award from the engineering mechanics department of Battelle Columbus Laboratories.

Michael Cocayne, senior from Dubuque, Iowa, and Jolene Grose, senior from Iowa City, won third place in Region VI of the 1995 American Society of Heating, Refrigeration, and Air Conditioning Engineers student project competition, in Atlanta, Ga.

Electrical and Computer Engineering

Karl E. Lonngren, professor, presented the Iowa Distinguished Engineering Faculty Lecture in March in Iowa City (see story on page 11). The lectures highlight faculty members who have received engineering research awards at The University of Iowa and Iowa State University.

Industrial Engineering

Edward M. Mielnik, professor emeritus, has been recognized for his 50 years of membership in the American Society for Metals International.

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