"Nothing focuses the mind like a real and immediate problem"

Professor Wilfrid Nixon
FROM THE DEAN

Last summer I was reminded once again of how important the quality of students, faculty, and distinctive programs are to the College of Engineering's growth in overall academic excellence. The college hosted several orientation sessions for parents of incoming freshmen. To illustrate the value of an engineering education at Iowa, we introduced the parents to some of the unique attributes that set the College of Engineering apart from its peer institutions.

After every session, the parents said that The University of Iowa was the right choice for their students. But they also remarked that the decision would have been even easier had the college's unique traits been spelled out to them when they began the application process.

Students and Parents Teach Us a Lesson

It was a good lesson for all of us. We often underestimate the impact that talents and achievements can make.

Interestingly, our list of the college's unique attributes isn't lengthy, but it has become long on influencing decisions for prospective students and their parents. Now that we are highlighting these achievements in our student recruitment program, I'd also like to share them with you, to underline the good reasons that you, as alumni, have to take pride in your College of Engineering.

- Demand to enter the college is high and admission is competitive. Applications have increased about 20 percent in the last five years, to some 1,000 annually, yet only about 250 freshmen are enrolled each year. The average ACT score is consistently above the 90th percentile, nationally.
- Engineering students (6 percent of the University's total enrollment) consistently win 30 percent of top UI freshman merit scholarships. Equally impressive, engineering students have won the prestigious MacArthur-Finkbine medal for scholastic and leadership excellence upon graduation for 10 of the past 12 years.
- About 25 percent of the college's undergraduate students are women, well above the 18 percent national average for engineering.
- Ninety-four percent of undergraduate engineering courses are taught by tenured and tenure-track faculty—the highest at The University of Iowa. About 20 percent of our faculty members have been recognized for their excellence as teachers.
- Nationwide, the college has one of only 21 accredited undergraduate programs in biomedical and bioengineering, and the only one accredited in the state of Iowa.
- At Iowa, students can become much more than engineers. The college provides a broad education, exposing students to a wide spectrum of technical courses as well as humanities and fine arts courses, such as languages, music, and writing.

- The college is the first in the nation to offer students the opportunity to earn a technological entrepreneurship certificate along with their engineering degree.
- Since 1980, the college has produced more winners of Tau Beta Pi national engineering honor society graduate scholarships than any other public university or college in the nation.
- In its annual ranking, U.S. News & World Report continues to place the college's graduate and undergraduate programs among the top nationwide. In fact, the magazine's latest graduate rankings place the college 46th among all engineering colleges and among the top three public colleges of similar size.

While the list left a lasting impression on our visiting parents, it also reminds us that in order to remain among the best, we must continue to improve.

Alumni Are Proof of Our Students' Success

We don't need to go far to validate that today's student success reflects the yield of past years' efforts: Our alumni continue to demonstrate tremendous achievements in a rigorous and rewarding profession.

Recently, the college inducted three of its graduates into its Distinguished Engineering Alumni Academy. H. William Lichtenberger, William Sangster, and R. William Van Sant were recognized for their engineering achievements, leadership, and service to their profession (see page 11). Lichtenberger, who is profiled on pages 4-5 of this issue, also will receive the University of Iowa Distinguished Alumni Award for Achievement at ceremonies during Alumni Weekend this spring. Each of the three inductees exemplifies the value of an Iowa education in helping shape leaders who enjoy successful, rewarding careers.

In addition, 13 living alumni of the college are members of the prestigious National Academy of Engineering. Many well known engineering colleges much larger than ours cannot count so many alumni as academy members.

To see how more of your fellow alumni are making their mark in engineering, turn to the Class Notes section in each issue of Iowa Engineer (see pages 19-21 of this issue). Your response to our question "What's new with you" makes clear the wide range of your interests and the breadth of your achievements.

As long as we can continue to point to the many accomplishments of those touched by the College of Engineering—whether they are aspiring high school students choosing a college, current University students on a disciplined path, or alumni who lead by example—then we can measure our progress effectively.
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Bill Lichtenberger’s story is one of dreams, diligence, and success, a quintessentially American tale. The seemingly simple plot line—immigrant family works hard and makes good—masks the emotional complexities of losing a homeland and struggling with new surroundings, a new language, and a new culture.

But Lichtenberger, who today is chair and chief executive officer of the Fortune 500 company Praxair, Inc., never has forgotten his peripatetic early years growing up in foreign countries and the home he found half a world away.

Lichtenberger was born in pre-World War II Yugoslavia. An executive of billion-dollar corporations, he has lived and worked in cities around the world. But next to the resume heading “home-town,” he always writes “Des Moines, Iowa.”

“I’m proud of my midwestern upbringing and ties,” says Lichtenberger, who earned a bachelor of arts (1957) and a bachelor of science in chemical engineering (1959) from The University of Iowa.

His two brothers still live in the state capital.

As a youngster during World War II, Lichtenberger witnessed daily bombings of his Yugoslavian hometown, Belgrade. At night he and his family slept in the basement. His grandfather, who led a Protestant bible school seminary in Austria, convinced them to move to that country, where they lived for the duration of the war and during six years of postwar British occupation.

In 1950 a church relocation program helped them establish a new life in Des Moines, where Lichtenberger began 10th grade at Roosevelt High School.

“As an immigrant family, we didn’t have much,” he recalls, “even though both my mother and my father worked. But they had great plans for us. I remember my father saying, ‘One of these kids is going to be a doctor.’”

Although none of the nevertheless-successful Lichtenberger offspring actually earned a medical degree, the elder son at least started down that career path.

“I earned a liberal arts degree in premed at Iowa,” Lichtenberger says, “and worked during the summers in the anatomy department. Those experiences helped me decide that I didn’t want to be a doctor.”

Shortly before graduation, Lichtenberger spoke with an academic counselor at Iowa who urged him to tackle chemical engineering. Two years later, he received his degree from the College of Engineering.

While earning his undergraduate degree at Iowa, Lichtenberger held down several jobs. He waited tables at the old Reich’s Cafe, sacked groceries at Whiteway Grocery, and washed dishes at Gamma Phi sorority. During the summers, he prepared cadavers for dissection at the medical school and worked as a night watchman at a fertilizer factory—two experiences that he describes as “very spooky.”

Lichtenberger credits a number of his fellow Iowa winters with helping him assimilate to American and university life.

“My Sigma Nu fraternity brothers took me under their wing and made me feel part of a community,” he says. “The medical professors I worked for and my engineering professors were intellectual and life mentors. And my father-in-law taught me golf.”

Among the people who influenced Lichtenberger was professor and chair of chemical engineering Karl Kammermeyer.

“He gave his students a lot of personal attention,” Lichtenberger recalls. “And he was a great classroom instructor.”

Shortly after earning his first undergraduate degree, Lichtenberger married Pat Thomas, a recent graduate of the University’s School of Commerce and an Iowa City native. Upon first meeting Lichtenberger, Thomas was not exactly smitten by the young engineering student.

“My fraternity and her sorority were building a homecoming float together,” Lichtenberger recalls, “and I had the enviable job of getting it built. Of course, everyone else just wanted to sit around and drink and talk, so I adopted something of the slave driver mentality. Pat turned to one of her friends and said, ‘Who is that obnoxious guy, anyway?’

“We’ve been married now for 39 years,” Lichtenberger adds, smiling.

After earning his chemical engineering degree, the newly wed Lichtenberger landed a position with Union Carbide Corporation’s research and development division. From a job designing distillation trays, he rose through the corporate hierarchy to become the company’s president and CEO in 1990.

Two years later, Lichtenberger was instrumental in establishing a spin-off company, Praxair, Inc. Today, he is chair and chief executive officer of Praxair, which employs 24,000 people and is the largest producer of industrial gases in the United States.

“Even though I began in engineering design,” Lichtenberger says, “I knew early in my career that I wanted to get into the business side of the business. And I knew that the combination of the technical and liberal arts training that I got at Iowa would provide a solid foundation from which to branch out even farther.”

Lichtenberger acted on his intuition, and in 1962 he earned an M.B.A. from the State University of New York at Buffalo.

“I was convinced I could do the most for Union Carbidc and for my career on the business and leadership side of things,” he says. “My first love has always been working with customers and creating new opportunities for the company to grow and become more profitable.”

Indeed, those efforts have paid off. Since Lichtenberger helped fledgling Praxair fly from its parent, the industrial gas company has enjoyed phenomenal financial success.
Four years ago, Praxair stock was valued at “a couple billion dollars,” according to Lichtenberger. Today that figure has skyrocketed to about seven billion. Sales have increased from 2.5 to 4.5 billion dollars over the last four years, and the company now operates in 45 countries.

The May 20, 1996, issue of Forbes magazine ranked Lichtenberger as the 12th most powerful executive in the U.S. chemicals industry and one of the most powerful chief executives in all of corporate America.

Prior to launching Praxair into the corporate stratosphere, Lichtenberger spent many years refining his piloting skills at Union Carbide. By 1975 he had been appointed vice president and general manager for the company’s Linde division in Geneva, Switzerland.

He returned to the United States in 1980 to become vice president and general manager of gas products and subsequently was named president of the chemicals and plastics group. In 1990 he became vice president and COO.

It was during Lichtenberger’s tenure at Union Carbide that the company faced its most sobering challenge, the 1984 disaster at Bhopal, India. More than 2,000 people died when a Union Carbide plant leaked methyl isocyanate into the air.

“He deals with business and customers,” he says, “but what I discuss with those customers is technology. The technical education I got at Iowa has served me extremely well during the last 30-plus years.”

He adds that one of the benefits of the environmental movement has been the creation of laws and agency regulations that have set standards for all companies in an industry.

“Without rules that apply to everyone,” Lichtenberger says, “it’s hard for one company to voluntarily change when its competitors continue to do business the old, and often lower-cost, way. Federal environmental laws, on the other hand, help to establish a level playing field.”

Lichtenberger credits his education at Iowa for helping him understand the policies of the public. He says that his background in liberal arts has enabled him to better appreciate his own role and the far-reaching impact of the industry.

“It’s important for corporate executives to remember that the decisions we make are social decisions that can affect the world community,” Lichtenberger says.

He adds that although he is a business executive helping to manage a large corporation, his field of expertise is, ultimately, technical.

“I deal with business and customers,” he says, “but what I discuss with those customers is technology.”

Lichtenberger says that although Iowa engineering clearly is on the right track, one critical element risks progress.

“The college community is looking to new heights,” he says, “but they can’t be achieved in a cramped and outdated building. For The University of Iowa College of Engineering to achieve its full potential, to really blossom, it must have an updated building.”

Lichtenberger hopes the college’s new direction will help provide the best possible opportunity for young students—the same kind of opportunities he had 40 years ago.

“My Iowa experiences were very important,” Lichtenberger says. “Living and going to school there provided crucial lessons in what America is about and in the values and standards of this society. It was a lesson I was glad to learn.”

Lichtenberger will receive a University of Iowa Distinguished Alumni Award at Alumni Weekend May 30-June 1. He also has been inducted into the college’s Distinguished Engineering Alumni Academy.

“It’s important for corporate executives to remember that the decisions we make are social decisions that can affect the world community.”
Baltimore, Md., January 7: Wilfrid Nixon sits inside a taxicab, inching and sliding through the record-setting East Coast blizzard of '96. The cabby, a native Russian, claims never to have driven in snow before. They are on their way to the Omni Shoreham Hotel from Baltimore Washington International Airport, where Nixon's plane landed just in time: By now the storm has forced the runways to close.

The taxi ride—normally a 40-minute trip—stretches into an hour and a half. As the cab struggles against the slush and the frigid, stinging wind, the entire east coast is grinding to a three-day standstill.

Nixon is in his element.

The University of Iowa associate professor of civil and environmental engineering and research scientist was traveling to a Transportation Research Board meeting, where he would join other experts from around the world to consider the formation, properties, and impact of ice. The timing of the blizzard couldn't have been better.

Regardless of the season in Iowa City, Nixon spends a significant part of his research time in Fahrenheit temperatures that range between 30 above and 20 degrees below zero. During any particular day, he and his graduate and postdoctoral students may peer through a scanning electron microscope at the structure of a single ice crystal or put the finishing touches on a project to measure the road pressure exerted by snowplows.

(continued on page 8)
Nixon enjoys the opportunity to conduct a spectrum of research from the fundamental to the applied. "Our work on the adhesion of ice to various surfaces demands that we deal with the basic physics of ice," he says. "That research entails horrendous math and complex theoretical models. On the other hand, we're also out there trying to solve challenging real-world problems such as how to determine the most effective, most efficient way to remove ice from roadways and landing strips."

This variety of research questions, approaches, and implications, Nixon says, keeps things lively.

The engineering professor and his staff conduct much of their research in five cold rooms at the University's Hydraulics East Annex, a modest building wedged between the east bank of the Iowa River and a parking lot whose rock-littered surface could provide valuable data on the physics of freeze-thaw action. As a member of the Iowa Institute of Hydraulic Research, Nixon is part of the largest team of University-affiliated hydraulic scientists in the world.

Ice first caught Nixon's eye during graduate school.

"According to my dissertation adviser at Cambridge, I had two choices," Nixon says. "Either study the behavior of an aluminum alloy under a load, or study the fracture and mechanical behavior of ice. I decided the first choice would allow me to learn more and more about less and less, and pretty soon I'd know absolutely everything about nothing. "Ice, on the other hand, seemed to be a real challenge. And fascinating."

Much like a mechanical engineer who examines the strength of materials and structures, Nixon studies various types of ice under different conditions to determine their fracture and fatigue properties. His work began with his doctoral research on the strength of ice/soil mixtures. Today he considers a range of questions, including novel efforts to propagate cracks along planes of a single ice crystal.

One of nature's great shape-shifters, ice can take on a fabulous array of crystalline forms.

"Columnar ice, granular ice, rubble ice, frazil ice—it's all the same stuff in different forms," Nixon says. "But one of the paradoxes of ice is that it is at once very brittle and very malleable."

"If we hit it hard and rapidly, or drop it," Nixon says, "it will crack or shatter. But if we slowly subject it to a load, it will deform extensively without breaking."

Glaciers exhibit this dual nature. The behemoths deform and creep hundreds of meters without cracking. But pick up a chunk off the surface and drop it, and it will shatter. Why?

Crystalline strength

The answer, Nixon says, lies in the crystalline structure of ice.

"Ice a few degrees below freezing is at more than 95 percent of its melting point," he adds. "I know of no other material that can be that strong at a temperature so close to its melting point. Just imagine what steel is like when it's heated almost to the point of melting."

The strength of ice has been recognized and exploited for millennia. Ice has even been used in construction: During World War II, the Canadian government built a prototype aircraft carrier out of ice reinforced with wood chips.

Yingchang Wei, a postdoctoral researcher working with Nixon, is studying the molecular nature of ice as it responds to fracture forces. For ice, as for any material, that means zeroing in on the microstructural crack tip and the stress field that extends in front of it.

"To understand how any material fractures," Wei says, "you must understand the forces that create and propagate a 'crack tip.'"

Take the case of paper. Ripping apart a piece of paper by pulling evenly from each side requires considerable force. But with virtually no effort at all, a 'crack tip' created on the edge of the paper will quickly result in a tear.

In order to model the fracture of ice, researchers need to understand the fracture image of a single crystal.

"For years, many people have been trying to characterize this image," Wei says. "We are the first to have succeeded."

A certain urgency

Nixon notes that while the molecular nature of ice intrigues researchers, ice also is "something we have to live with." In the real world, that means someone has to figure out how to prevent ice from closing commercially vital waterways, how to fend off ice flows heading toward offshore oil rigs, and how to remove ice from the streets and highways before the morning school buses hit the roads.

These and other pragmatic questions have sparked much of the research conducted at Iowa since the late 1960s, when the late John Kennedy, professor of civil and environmental engineering and director of the Iowa Institute of Hydraulic Research, developed an interest in studying ice caps that can cover rivers.

"Jack was an expert in how river flow was influenced by the shape of riverbeds," Nixon says, "and he realized that with a cap of ice, water is no longer a free surface. He began to question just how this phenomenon changed flow and therefore ultimately changed the riverbed."

Kennedy began to forge ties with individuals—some of whom were Iowa graduates—at the United States Cold Regions Laboratory in New Hampshire.

Iowa researchers also began looking at other theoretical and practical problems of ice, including the nature of ice jams and their potentially devastating impact on downstream communities, and how superchilled water—"frazil ice"—sticks to the water intake gratings of power plants.

"And Robert Ettema [professor of civil and environmental engineering] has studied how ice breakers can become ice makers by exposing 'fresh' water to freezing air," Nixon adds.

Nixon's own work has focused on the interface between ice and various structures, particularly in terms of what he calls "the roadway thing."

With the cooperation of the Iowa Department of Trans-
portation. Nixon is testing various techniques for removing snow and ice from roads. He has found that two variables strongly influence the success of snowplows: the angle of the plow blade and the force with which the blade pushes against the road surface.

"We've developed several rather exotic blade shapes in the lab," Nixon says, "and this winter we're hoping to test them with the cooperation of IDOT road crews."

Nixon is predicting that one such blade, which boasts a carbide insert along the front edge and a clearance angle of 20 degrees between the back edge and the ground, will win the snow removal contest. Another Iowa-designed blade that is serrated also should be a contender.

On a hot late-summer day, two orange snowplows—one with an underbody plow and one with a front-mounted plow—stand outside the Wind Tunnel Annex. They are not ordinary machines, however, because Nixon and postdoctoral researcher Andrew Whelan have "instrumented" them. In addition, the front-mounted plow displays one of Nixon's newly designed serrated plow edges.

"We put pressure sensors on the hydraulics of the underbody plow," Whelan says, "to help us determine the most effective blade angle and downward force. On the front-mounted blade we hooked up accelerometers to help determine the plow's ideal acceleration."

The trucks already have been tested in a 'closed road' trial conducted on the concrete apron at the foot of the Coralville Dam spillway. Now two trucks of each model are hitting the road in a field test by IDOT employees. Nixon says he hopes to ride along for one of the tests.

The computer data from each trial are being processed via a dynamic modeling package that will help Nixon and Whelan determine which snow removal system is best for which kinds of snow and ice conditions.

Using computers, Nixon has gathered preliminary data on how experienced plow drivers set plow angles and pressure for optimal snow removal.

"Eventually," says Lee Smithson, deputy director of IDOT's maintenance division, "we would like to see data like this translated and computerized to help guide inexperienced drivers. We're very excited about how this research will help get the ice off Iowa roads faster and better."

Nixon's lab and field research, funded by the U.S. Department of Transportation, also is expanding to include issues about how to remove ice with chemicals.

"Salt and sand each have their own unique problems," says Nixon, who admits that at his house the best snow removal system is "children."

"Salt rusts cars and seeps through concrete to rust the reinforcing steel on bridges and roads. As it washes off the roads in the spring, salt may salinize the ground water."

In addition, sand tends to become ground into a fine particulate that has been cited as a cause of air pollution in Portland, Ore., and other cities.

"We're looking to determine if there are other chemicals that are as effective but less damaging to structures and the environment," Nixon says. "Our goal is to produce a guide that will help officials determine what type, amount, and form of chemicals to use under particular snow, ice, and temperature conditions."

Not just down-to-earth

Recently, Nixon has turned his attention toward yet another ice issue with real-world implications. This fundamental research, which focuses on the adhesion of ice to surfaces, has piqued the interest of commercial airlines.

"Actually, it began with an eye to de-bonding ice from airports," he says, "but may well have implications for the deicing of airplanes."

Removing ice from a surface presents a basic problem: how to persuade a crack to run along the ice/structure surface rather than into the ice itself. Using principles from interfacial fracture mechanics and applying a number of sample geometries, Nixon has arrived at a new technique for measuring the effectiveness of different coatings and surface treatments. The next step is obtaining funding to conduct the tests themselves.

Nixon obviously enjoys the interplay between conducting basic research in the lab and applying it in the field.

"Nothing focuses the mind like a real and immediate problem," he says. "In the academic world, the height of success is publication in journals like Science or Nature. But the city and county engineers with whom I work hardly ever read those journals. I find great satisfaction in balancing basic research with applied work that is warmly received by county engineers. The two ends of the spectrum keep me intrigued and keep me real."
Support from all quarters is moving college ahead
Alumni can help ensure success

The College of Engineering is embarking on one of the most exciting projects in its history—modernization and expansion of the Engineering Building. The project, long overdue, will help propel the college into the next century, allowing it to enhance its educational programs in the years to come and to move forward as a leader in engineering education.

As I mentioned in the last issue of Iowa Engineer, the state was generous in its support for the building project. But the Iowa Legislature’s appropriation of $14.1 million will cover only a portion of the capital investment. The University has made a commitment to supply another part of the construction cost, while the rest must be provided through private fund-raising.

I will work with College of Engineering alumni to meet our financial goal and make sure that this campaign is a success. Because of the significant challenge that this fund-raising campaign presents, I am now working full-time as the director of development for the college rather than splitting my time between the Colleges of Engineering and Dentistry, as I have in the past. This new assignment is an exciting one for me, and I look forward to working with you to advance the college.

The fund-raising campaign will take place over the next three years. 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. A more broad-based campaign for all alumni and friends will begin in 1997-98, during which the college will hold alumni receptions in strategic locations around the country. By the time this campaign is completed, every College of Engineering alumnus will have a chance to show his or her support for this project.

As one of the first steps in launching this campaign, the college has assembled a Campaign Steering Committee made up of 29 of the college’s most successful and loyal alumni and friends, who will provide the volunteer leadership so essential to the success of a campaign of this magnitude. The committee, which met for the first time in early November, has already provided Dean Miller and me with a great deal of valuable advice and counsel. [Campaign Steering Committee members are listed on page 11.]

Salmon escape is no fish story

A College of Engineering project to divert baby salmon around hydroelectric dams in the Pacific Northwest continues to draw support from the state of Washington (see Iowa Engineer, fall/winter 1995).

Jacob Odgaard, professor and researcher at the Iowa Institute of Hydraulic Research and associate dean of the college, last fall received $1.5 million in additional funding from Washington’s Grant County Public Utility District No. 2 to continue work on the project. That brought research funding for the University’s work on the salmon project to a total of more than $5.5 million.

In October, the college opened a new salmon research facility on the University’s Oakdale Campus. The new facility, which joined already-existing research quarters used for the project, accommodates a new scale model of the Columbia River and its hydroelectric power plants—one of the largest hydraulic models ever used for research. In addition, the hydraulic institute has purchased a supercomputer to handle computations for the project.

Although the salmon protection devices may cost some $60 million per hydroelectric dam, the work is vital to the Pacific Northwest, Odgaard says, adding that the salmon fishing industry on the Columbia River alone has been valued at more than $1 billion.

Rich Wretman
Director of Development
College of Engineering
The University of Iowa College of Engineering inducted three new members into its Distinguished Engineering Alumni Academy on February 15, 1997. The induction ceremony and brunch, held at the Iowa Memorial Union, were a prelude to the University’s celebration of National Engineer’s Week.

The three inductees, honored for professional achievements, leadership, and service to engineering and society, are H. William Lichtenberger, William M. Sangster, and R. William Van Sant.

Lichtenberger, who received a bachelor of science in chemical engineering from the College of Engineering in 1959, is chair and CEO of Praxair, Inc., of Danbury, Conn., the country’s second largest producer of industrial gases. (Lichtenberger is profiled on pages 4-5.)

Sangster earned a bachelor of science in civil engineering in 1947 and master’s and doctoral degrees in mechanics and hydraulics in 1948 and 1964, respectively. Sangster is director of international programs for the Georgia Institute of Technology, in Atlanta. He previously served as dean of the institute’s engineering college from 1974 to 1991, and he is past president of the American Society of Civil Engineers and cofounder of the National Consortium for Graduate Degrees for Minorities in Engineering and Science, Inc.

Van Sant received bachelor’s and a master’s degrees in mechanical engineering in 1966 and 1967, respectively. He is chair, president, and CEO of Lukens, Inc., of Coatesville, Pa., a major specialty steel manufacturer. He also has served as director and president of the National Association of Manufacturers and as trustee and president of the Manufacturers Alliance for Productivity and Innovation, and has held executive positions at Blount, Inc., Cessna Aircraft, and Deere & Company.

The 1997 ceremony, hosted by Theta Tau, National Professional Engineering Fraternity, marks the beginning of the academy’s second year and brings its membership to 21. Eighteen charter members were inducted in February 1996 (see Iowa Engineer, Spring 1996).
Digital imagery is one of the most exciting advances in the engineering world today. Digital images, represented by a matrix of dots whose brightness and color are determined by integer numbers, enable computer screens to produce brilliant color and sharp resolution. The ability to create, manipulate, and process complex digital images has become vital to research in many technical fields, particularly biomedical and industrial engineering. And The University of Iowa is fast becoming a leader in educating image engineers, thanks to an $890,000 equipment grant from Hewlett-Packard Co.

The grant has provided 28 advanced UNIX workstations and auxiliary equipment, all located in a 40-seat electronic classroom recently set up at the College of Engineering. In addition to opening the sophisticated Quantitative Imaging Electronic Classroom last semester, the college also has provided $50,000 worth of supporting materials for students and faculty members.

The new educational center is part of a joint collaborative teaching effort by the colleges of engineering, education, medicine, and liberal arts. Instructors will use the computers to broaden the scope and enhance the depth of undergraduate and early graduate level courses.

According to Dean Richard K. Miller, one of the college's major goals is to give its students the opportunity to become uniquely qualified participants in the electronic imaging revolution.

"We are using the computers both to teach and to let the students independently explore solutions," says Milan Sonka, associate professor of electrical and computer engineering. "In addition, we can use the computers to test the students and find out if they really understand the theory and have gained the practical experience."

Sonka and Edwin Dove, professor of biomedical engineering, have been using the classroom to teach courses this year.

"I've sat in on several classes," says Steve Collins, professor of electrical and computer engineering, "and found them to be absolutely exhilarating. It's exciting to see just how much this technology can enhance the learning process. I can only imagine what the next 10 years will hold."

Sonka adds that for anyone accustomed to using blackboards as teaching tools, the electronic workstations are at once extraordinary and challenging.

"It has been time consuming to prepare the instructional material," Sonka says. "I spend every night before class developing the [World Wide] Web material we'll use the next day."

"For the professor to keep everything going and in sync requires no trivial effort," Collins adds. "At times you feel as though it all might go right over the brink, but Professors Sonka and Dove have done a tremendous job juggling the demands of the equipment."

"I am absolutely convinced that our students who are interested in digital image processing are gaining a much, much better educational experience thanks to this new technology."

Students in the college's Quantitative Imaging Electronic Classroom get a close-up look at how Professor Milan Sonka solves a problem (that's Sonka's hand on their computer screen), and he can see on his own screen how they are solving it. Sonka can transmit class materials to his students so that they don't have to crowd around one computer or pass one volume around. What's more, verbal communication in this classroom is surviving the computer age quite nicely. On a recent visit, Iowa Engineer found students sharing their insights about the work at hand with each other and their professor.

The digital image processing web site can be found at http://www.icaen.uiowa.edu/~dip
Start Your Backhoes: Building Project Nears

The last time the College of Engineering got a face-lift, Lyndon B. Johnson was president, the war in Vietnam was heating up, and Gemini-Titan spacecraft circled the earth in preparation for an eventual Apollo lunar landing.

The intervening years have taken their toll on the college facilities, and the technical needs of a new engineering era demand equipment and space not currently available at the college. To provide the best possible educational and research environment for the University's engineering college community, the college will begin a massive $26 million improvement project this year.

Last June the Board of Regents approved the preliminary plans for the renovation and addition. Groundbreaking will be in May, with completion of the entire project estimated to occur in 2001. The project will begin with the construction of a new 69,000-square-foot addition on the south side of the existing building.

The Iowa legislature has provided $14.1 million for the modernization project and the University will provide a portion of the remaining funds. The rest will be generated through a fund-raising campaign among college alumni and friends. Fund-raising goals were announced during National Engineers Week, in February.

"Given the history of support we have received from alumni and industry," says engineering dean Richard K. Miller, "I expect we'll do very well in providing non-state funds for this vital project. It's always important to keep in mind, however, that when launching such a complex project, we can't take financial support from any source for granted."

He adds that enthusiasm for the project is running high.

"Clearly, this is the most exciting project the college has undertaken in many years," Miller says. "I am humbled by the almost unanimous support we've received from faculty members, alumni, and students. It's almost unheard of in a university setting to have such overwhelming support for such a complex project."

Miller notes that now is the quiet—but crucial—phase of the project. He adds that soon enough, it will be anything but quiet.

"We chose to remain near the liberal arts and business colleges rather than start from scratch at a more remote location," Miller says. "This means we'll have to build the addition and renovate the original building simultaneously. For a while it will be a little like changing a spark plug while driving 60 miles an hour."

When completed, the construction project will provide new classrooms and laboratories, access to the Iowa Communications Network and other worldwide communication links, an expanded library and learning center, and welcoming spaces for students and faculty members to gather, talk, and study.

"Right now, students simply don't think of this building as a place to study," Miller says. "Even when it's 10 below and storms are raging outside, students go elsewhere to study rather than search for a chair and a corner in the hallway. The percentage increase in study space alone will measure in the thousands because we're starting from zero."

The project also will increase the size of teaching labs by 40 percent. "This is not just a renovation," Miller says. "We are going to improve the educational experience dramatically."

What's the story behind these dates and symbols?

Alumnus and Iowa Engineer reader Stuart Meyers answered that question, posed in the spring/summer 1996 issue, about the carved stone panels that adorn the Engineering Building. Meyers, who received a B.E. in industrial and management engineering in 1927 and an M.S. in mechanics and hydraulics in 1928, wrote:

"These panels were originally smooth, blank stone, and each successive engineering class, from 1906 (the year I was born) through 1927 (the year I graduated), had a panel carved as a class memorial. My class had some inconclusive discussions about what symbol we would choose for our memorial, but when Lindberg flew to Paris in May 1927, we had to do something to commemorate that event, so our choice was necessarily an aircrew, or propeller, which now graces the last panel at the west end of the Engineering Building. This was years earlier than the jet engine and the helicopter, at a time when the propeller was an absolute essential for any aircraft."

Thank you, Mr. Meyers, for solving the building panel mystery, which has intrigued alumni, students, faculty, and college visitors for years.

Meyers is a retired hydrologist who worked for the U.S. Geological Survey, in Denver, Colo. He lives in Burlington, Wash.
Educators and businesses work to broaden access

It may be the wave of the future, but at the College of Engineering, long-distance learning already has a past. For the last quarter century, engineering faculty members have helped educate students at off-campus locations across the state. Most of those students are unable to attend campus classes full-time because they already are professional engineers working in Iowa industries.

As demand for distance learning grows, The University of Iowa is exploring new teaching technology that may have a profound impact on engineering education in the state. The new techniques will vastly broaden the scope of classroom teaching and allow the college to reach a larger and more diverse student audience.

"We're hoping to focus greater effort on developing an even stronger distance learning program," says Sudhakar Reddy, professor and chair of electrical and computer engineering. "The creation of such an educational opportunity will require a real commitment to improved technology that can successfully take classroom teaching to remote sites."

John Robinson, professor of electrical and computer engineering and associate dean for academic programs, is helping to coordinate the many aspects of the distance learning initiative.

"We are creating a partnership between The University of Iowa, Iowa State University, community colleges, and corporations across the state," Robinson says. "And the tremendous commitment by Iowa to a state-of-the-art communications network will help this new partnership flourish."

As the design and development of new technologies increase exponentially, industries across the country are seeking ways to keep their engineers current. During the last 20 years, Iowa has forged strong educational ties with Rockwell Collins Corporation in Cedar Rapids. Companies like Rockwell are turning to Iowa's engineering college to help train and retrain their professionals for the future.

So far, more than 75 Rockwell Collins employees have earned master's degrees from Iowa while continuing to work full-time. Rockwell engineer Yan Houser was among those who took the opportunity to earn a graduate degree while making a living.

Houser has worked as an electrical engineer at Rockwell Collins Corporation for 10 years. He has worked on several projects related to the design and development of new technologies that significantly impact the industry. During this time, he has also completed his master's degree in electrical engineering at the University of Iowa, while working full-time.

"This semester we're using mixed delivery," Reddy says. "I drive to Rockwell Collins to teach Testing Digital Logic Circuits, while Professor [Steve] Collins uses the microwave link to teach Digital Signal Processing right from Iowa City."

But each method offers challenges. Traveling demands extra time, which faculty members must balance with college class schedules. A course taught in Davenport, Reddy notes, requires the investment of two hours of driving for every hour of class. On the other hand, instructors and learners who are separated by miles may miss the on-site classroom ambience.

Reddy and Collins are exploring new teaching methods that draw on the strengths of both traditional and high-tech delivery. Future remote classrooms will combine the efficiency and cost-effectiveness of today's microwave technology with the rapport-building benefits of teacher/student interaction.

The new long-distance approaches are not intended to replace traditional classroom teaching, but rather to complement and enhance it. The goal is to provide a flexible and accessible educational experience for students at all locations.
Rockwell since receiving her bachelor's degree in electrical and computer engineering at Iowa in 1992. Shortly before graduation she found herself in a quandary.

"I'd been accepted into Iowa's graduate program," Houser says, "but also had been offered a job with Rockwell. Of course I wanted to do both."

The distance learning program helped her do just that. When she completes her master's degree in computer science this May, Houser will have five years of on-the-job experience with Rockwell.

"The distance learning program has been great," she says. "Without it, I wouldn't have been able to finish my graduate studies. It's a wonderful way to learn while simultaneously applying that education to your real-world experience."

Because of its specialized focus and reduced emphasis on course work, graduate education lends itself especially well to distance learning. But Reddy, Robinson, and engineering dean Richard K. Miller hope that some day even students pursuing undergraduate studies will be able to earn a bachelor's degree at the University without spending four years on campus.

"There is a new wave in university/industry relations," Miller says. "Industries are encouraging universities to develop undergraduate degrees in concert with local community colleges, such as Kirkwood."

"For instance," Robinson says, "representatives of the steel company IPSCO have approached us about the possibility of offering undergraduate courses at their new facility near Muscatine. We've met with faculty members from ISU and Muscatine Community College to explore various ways we might accomplish this."

"We have an extremely well qualified faculty at the engineering college," Reddy adds. "Why shouldn't more Iowans benefit from that?"

Educating off-campus undergraduates is not without difficulties, however. Because most students who take courses off campus work full time, they normally take only one course per semester. At that rate, an undergraduate might spend 10 years earning a degree. In addition, engineering students need good hands-on experience, which might be difficult to provide away from campus laboratories.

Despite these potential obstacles, Iowa industries increasingly seek help to educate and re-educate their employees. And if they can't find what they are looking for in Iowa, companies will turn to out-of-state institutions that can provide what they need.

"Minnesota and Wisconsin are aggressively stepping into this area," Miller says. "Minnesota already offers a bachelor of science in electrical engineering by distance."

Miller adds that Iowa is undergoing a major University-wide review of how electronic technology can best serve education, including education from a distance.

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Distance Learning (continued from page 15)

on the speaker, enabling remote students to see as well as hear who is talking.

At the remote sites, high resolution monitors—one for every two students—will engage students more effectively than a single TV screen and will enable them to interact better with their on-campus teacher.

"The really exciting aspect of all of this," Robinson says, "is the ability to reach many people who are distant from one another. Some day it will be possible to conduct an interactive class composed of, say, eight students in Iowa City, four at Kirkwood Community College, six at Rockwell Collins, and three at Southeast Iowa Community College."

In the past, each of these groups alone might have been too small to justify the investment of time and money required for a long-distance course. But with the right technology and strong commitment, Iowa soon will be able to draw together professors and far-flung groups of students into a vibrant community of thinkers.

Space scientist seeks the best in all worlds

Although many an Iowa alumnus can claim to have found in college a marriage made in heaven, Pearl Cheng is probably the only one who at the same time discovered a career in space.

Cheng earned her bachelor's degree in biomedical engineering in 1981. Since completing her master's degree at Stanford University a year later, she has worked at the National Aeronautics and Space Administration's Ames Research Center, where she has developed life science payloads for various missions to space. Acting deputy division chief of the Space Projects Division since 1994, Cheng supervises the development of such projects.

While a freshman at Iowa, Cheng met her future husband, Robert G. Campbell.

"We had several classes together," Cheng says, "and we both were active in the Society of Women Engineers. SWE was a vibrant part of student life, and Bob was one of several men who got really involved in it."

Campbell graduated in December 1981 with a degree in electrical engineering. He completed postgraduate work at the University of Santa Clara and then joined Hewlett Packard, where he is a senior systems architect.

Campbell holds a number of patents on his HP equipment, and he developed a file, print, and applications server that was recognized as the most valuable product of the year by PC Week.

Cheng, whose graduating class was 20 percent women, says SWE not only gave her support during her undergraduate years but actually enticed her into engineering in the first place. "Miss Greenwald, my geometry teacher at West High, sparked my love of math," says the Iowa City native. "One day she handed me a brochure..."
and said, 'Pearl, why don't you look into this conference?'

The event, sponsored by SWE for high school girls, was called “Consider Engineering.” Cheng says it was “a real turning point” in her life.

As an engineering undergraduate, Cheng worked to develop and promote a new peer counseling program that helped the dean’s office advise undergraduate students. While working as a peer counselor, both Cheng and Campbell became well acquainted with assistant to the dean Norlin Boyd, who helped launch the program and continued to sponsor it.

“Norlin was one of the most caring people I met during my college experience,” Cheng says. “He really worked hard for students and listened to their needs.”

Campbell echoes those sentiments, adding that when they visit Iowa City, he and Cheng try to see Boyd and their other college mentors, including professor of mechanical engineering and former dean Robert Hering, professor of electrical and computer engineering Karl Lonnagren, and professor of electrical and computer engineering Sudhakar Reddy.

Cheng’s dedication to service and scholarship continued throughout her undergraduate years, and as a senior, she was presented with a Virgil M. Hancher Memorial Award.

After graduating in May 1981, she worked during the summer to develop and direct orientation sessions for entering engineering students.

Her interest in helping her peers—specifically encouraging women and minorities in engineering and science—continues to be an important part of Cheng’s professional life. At NASA-Ames, she has chaired several advisory groups on minority representation in the sciences. She served as co-chair of the NASA-Ames Multicultural Leadership Council and is actively involved in recruiting for the agency.

In 1993 NASA-Ames recognized Cheng’s efforts with its Honor Award for Equal Employment Opportunity.

During the last 11 years, Cheng also has been a member of the NASA Speaker’s Bureau. To help celebrate National Engineers Week 1996, the College of Engineering invited Cheng to speak on campus about her work.

**Savvy advice**

In a special seminar, Cheng stressed that to compete in today’s world, students not only must obtain a solid technical education but also must acquire a global perspective, know the job market, and be savvy about moving up academic and professional ladders.

She added—not at all as an afterthought—that young people also should be willing to volunteer.

Cheng herself volunteers four hours a month as a facilitator to help small groups of NASA-Ames employees discuss the challenges and benefits of living and working in a culturally diverse society. The groups bring together employees from a variety of ethnic, geographic, and educational backgrounds, of both genders and many ages.

“These groups allow people to talk about diversity in a safe haven,” Cheng says. “After doing this for a year, we’ve seen improved understanding among employees and a real broadening of relationships. It’s a great way to help people rub elbows with others whose paths they otherwise may never have crossed.”

In September Cheng participated in a panel discussion on diversity at the college. Sponsored by SWE, the Women in Engineering Committee, and the Multiethnic Engineering Student Association, the discussion considered the significance and benefits of diversity in the profession.

Cheng says the chance to work with people of many different backgrounds and various technical expertise was one of the things that attracted her to NASA-Ames in the first place.

“My Iowa education had provided a solid technical background,” she says, “and I wanted to work with many different kinds of people. NASA offered me the opportunity to do that as well as to capitalize on my education. It was exciting to know that early in my career I would be designing, developing, and testing life science experiments for Spacelab and shuttle missions.”

**Probing deep space**

Over the years, several of Cheng’s projects have caught the eye of the popular press. One that gained national attention was her study of how microgravity in the Space Shuttle affects fertilization and development of frog embryos. Developed and flown in 1992, the research demonstrated that animals do not necessarily need gravity to reproduce successfully.

Cheng also has guided the development of projects to determine what support will be necessary in space stations and for human exploration of Mars and the moon. As NASA has continued to extend our reach far beyond our own atmosphere, Cheng has supervised a number of major experiments for the Galileo Probe to Jupiter, the Mars Pathfinder, and Lunar Prospector. Currently, she is directing research to determine whether the moon’s poles contain ice.

Cheng is one of several women scientists at NASA who are featured in a recruiting brochure.

She obviously is pleased to serve as a role model for young women who are working toward an engineering career.

“When I was in school the college was just beginning to hire women, so there was no one for me to look to as a role model,” she says. “In the years since, that has changed somewhat, although there is always room for improvement.”

Although Cheng and Campbell lead busy and successful professional lives, they have, Cheng says, “a new focus.” Dinner table conversation at the Cheng/Campbell home now is more likely to focus on their four-year-old daughter and two-year-old son than on engineering.

“Raising kids is really a lot of fun,” Campbell says. “Recently I asked my son if he hit his sister, and he said, ‘Not yet.’ ‘Pearl and I just cracked up.’

Cheng and Campbell share a deep appreciation for their Iowa years.

“I have such good memories of my undergraduate days,” Cheng says. “The College of Engineering offered me a challenging technical education, but it also encouraged me to reach beyond the technical to a broader understanding of the world. It shaped not just my career but also my life.”
New lab puts 3-D CAD on WWW faster than you can say ASAP

The College of Engineering has a new Internet laboratory among its array of teaching and research tools. The room, equipped with 16 computers, accommodates students who need to use the World Wide Web to communicate with other researchers worldwide.

"Basically we're trying to counteract distance by using the Internet," says Peter O'Grady, professor and chair of industrial engineering. "Using these communications tools, we can virtually eliminate the need to construct initial prototypes."

The lab offers students the opportunity to send computer-aided designs over the Internet so that other researchers can look at them in interactive 3-D.

"People at the other end can rotate the CAD images we send," O'Grady says. "Short of holding the design in their hands, that's the best possible view."

"The lab also creates an interactive environment where we can communicate in real-time through voice, video, and chat rooms. There's even a 'white board' where anyone in the conversation can paste up a comment."

Already engineering students and faculty members are exploring use of the computers in collaboration with health sciences personnel to send and receive 3-D X-ray images.

"Doctors at the hospital can manipulate these images for the best possible view," O'Grady says.

They'll be able to interact with other doctors in rural Iowa or in Bosnia to help with diagnosis, surgical advice, and providing prognoses.

"In a sense, we're making geography irrelevant."

Although the Internet lab uses commercially available programs, O'Grady also is developing new algorithms to accomplish innovative and more sophisticated techniques for research across the miles.

"These advances are critical to help shift engineering from a profession where individuals work independently," O'Grady says, "to one where people are linked via a vast number of computers around the world."

Professor Peter O'Grady and his students use a computer in the Internet Lab to examine a part made by a Korean firm; they can rotate the image, viewing it from all angles, as though holding it in their hands.
1930s

Robert Hale (B.S.M.E. '37) lives in Sun City, Calif.

1940s

James M. Robertson (Ph.D. '41) is retired and lives in Summit County, Colo., with his wife, Margaret. Robertson has enjoyed a long and varied career. After leaving Iowa, he worked for the Navy and for Douglas Aircraft. He also taught engineering mechanics at Penn State, where he was the first director (1945-54) of the Garfield Thomas Water Tunnel, a U.S. Navy research facility still used today. In May the American Society of Mechanical Engineers dedicated the tunnel as a historic mechanical engineering landmark.

From 1954 to 1982, Robertson was a professor of theoretical and applied mechanics at the University of Illinois. In 1989 Illinois presented him with an Alumni Honor Award.

When he is not skiing, Robertson consults, lectures, and is a director for Terabyte, Inc. Both he and Margaret enjoy civic work. They were key players in planning and fund-raising for the Summit County senior center and have spent 10 years as directors for the Breckenridge Music Institute. In fact, Robertson writes, they are so busy that Margaret says they need to "retire from retirement."

Leo A. Modracek (B.S.Ch.E. '43) retired in 1982 from Rockwell Collins, in Cedar Rapids, where he had worked for 35 years as a manager. Since then, Modracek writes, he is busy as a board member of Cedar Rapids' National Czech and Slovak Museum and Library, having chaired the building committee for the recently completed $3-million project. He also volunteers in the local elementary school remedial reading program and enjoys gardening, remodeling projects, and fishing.

Frederie N. Schneider (B.S.M.E. '43) retired as a senior research engineer for Amoco Oil Co. After earning his bachelor's degree at Iowa, Schneider did graduate work in petroleum engineering at the University of Oklahoma and taught in Egypt and China. He lives in Tulsa, Okla., and reports that he enjoys having time to travel.

Philip G. Hubbard (B.S.E.E. '46, M.S. '49, Ph.D. '54) has written a book, New Daunt: A 150-Year Look at Human Rights at The University of Iowa, in conjunction with the University's sesquicentennial celebration. He also spoke on "Unfinished Symphonies" at a convocation during the University's annual Martin Luther King Jr. Human Rights Week. Hubbard, UI professor emeritus of mechanical engineering and manufacturing, is also a charter member of the College of Engineering Distinguished Engineering Alumni Academy. He has also been re-elected to the University of Iowa Foundation board of directors, for a three-year term.

Charles F. Rolfe (B.S.E.E. '51) lives in St. Louis, Mo., where he retired in 1991 after 40 years at Union Electric. Rolfe writes that he was a project and supervising engineer in transmission line design at Union and that he worked on several 345kV lines, including one that connects to the Hills, Iowa, substation south of Iowa City.

F. Thomas Boswell (B.S.Ch.E. '52) retired in 1989 after 37 years at Goodyear Tire and Rubber. Boswell, who traveled nationally to Goodyear's tire plants and truck tire centers, now has time to enjoy golf and fishing. He lives in Norton, Ohio.

Charles E. Small (B.S.E.E. '52) lives and works in Westford, Mass. He owns Professional Engineering Services, a consulting firm on product malfunction or failure and loss prevention. After receiving his bachelor's degree at Iowa, Small went on to earn an M.B.A. from Rivier College, Nashua, N.H.

Harold Rupert Valentine (M.S. '53) retired in 1982 as a professor and pro-vice chancellor of the University of New South Wales, Sydney, Australia. He lives in Narembeen.

Clifford V. Smith Jr. (B.S.C.E. '54) has been elected to the board of directors of the University of Iowa Foundation. Smith, president since 1980 of the GI Foundation, also sits on the College of Engineering Development Council and is a charter member of the college's Distinguished Engineering Alumni Academy.

Richard P. Havercamp (B.S.E.E. '55, M.S. '57) is retired from Xetron Corp., a division of Northrup-Grumman/Westinghouse, where he was an engineering manager in multicoupler redesign and production.

Before that he worked 13 years as engineering department head for Oaktron Industries, in design and production of loudspeakers for military and commercial markets, and 17 years at Collins Radio, in design of military communications gear. Havercamp lives in Mt. Vernon, Iowa.

Ronald E. Butler (B.S.E.E. '57) recently received an Ed.D. from Biola University and is assistant pastor at Canyon Lake (Calif.) Community Church. Butler writes that his engineering training at Iowa and 15 years of work at Lockheed Aircraft Corp. prepared him well for his second career, the ministry, in which he has worked for the past 25 years. Butler lives in Canyon Lake.

Donald E. Riley (B.S.E.E. '57, M.S. '63) retired in 1983 as chief electrical engineer for Navistar International Transportation. He lives in Fountain Hills, Ariz.

Thomas A. Church (B.S.M.E. '59) is president of Thornton Associates, Inc., of Lombard, Ill. He lives in Naperville.

Jerry Stringfellow (B.S.M.E. '59) retired this year after a career as engineering manager for a supplier of automotive vibration control products. Stringfellow writes that he spends four months in Florida and the balance of the year with his four children and six grandchildren.

Donald R. Thomas (B.S.M.E. '59, M.S. '66) retired in 1994 as senior engineer at Komatsu-Dresser Co., a manufacturer of off-highway mining trucks. After earning an M.S., Thomas taught at Bradley University for 10 years before joining Komatsu-Dresser then earned a Ph.D. in management as a senior design engineer for power trains. He lives in Peoria, Ill.

1960s

George W. Heasly (B.S.M.E. '60) retired in 1995 from Northrop Grumman Corp., where he was a specialist in material handling. Previously he had worked with United Parcel Service and Vons Grocery Co. Heasly reports that he and his wife, Irma, travel full-time and love it. The Heasleys live in Livingston, Tex.

Gerald E. Myers (B.S.E.E. '60) retired in 1986 after 36 years in sales engineering and management positions with General Electric. He still does consulting for the company. Myers lives in West Des Moines.

Allan L. Poole (B.S.Ch.E. '61) was honored by the Illinois Society of Professional Engineers with its 1996 Professional Engineering Management Award. Poole is director of public utilities for Utility Electric Co. Poole lives in Greensburg, Pa., and Hilton Head, S.C.

John M. Beatty (B.S.M.E. '52) is retired. He lives in Greensburg, Pa., and Hilton Head, S.C.

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Dennis F. Zmolek (B.S.M.E. '63) lives and works in Marshalltown, Iowa. He is director of manufacturing for engines and valves at Fisher Controls, Inc., where he has been employed for 33 years. Zmolek's current work emphasis is manufacturing strategy.

Jack Glover (Ph.D. '64) works with Hewlett Packard, in Palo Alto, Calif.

Larry E. Reynolds (B.S.Ch.E. '64) lives and works in Helenville, Wis., where he is owner and president of MetroStyle, Inc., a commercial real estate development company. Reynolds, who retired as group vice president for Measha Corp., also does some consulting.

Jin Wu (Ph.D. '64) lives in Taiwan, where he has been appointed cabinet minister for education. Last year Wu was named president of National Cheng Kung University, in Taiwan.

Wayne E. Kruse (B.S.C.E. '65) is senior planning engineer for the Los Angeles, Calif., water department. Kruse and his wife, Margaret, recently celebrated their 30th wedding anniversary by spending three weeks in China and Hong Kong. They visited Wayne's sister in Beijing and cruised up the Yangtze River past the site of the Three Gorges dam project. The Kruses live in La Canada.

Dave Powell (B.S.Ch.E. '65) has retired as fleet manager for Chevron Shipping Co., after 35 years with the firm. Powell worked in foreign and domestic assignments, most recently as fleet manager for Chevron's shipping company, vice president of operations for the firm's pipeline company, and chief operating officer for its Bahamas oil refining company. Dave and his wife, Joyce, live in Monaga, Calif., but plan to relocate in about a year.

Herm Reininga (B.S.I.E. '65) is vice president of operations for Collins Avionics and Communications Division. Two of the Collins plants that report to Reininga have been named Top 10 Best Plants by Industry Week, as announced in the magazine's November issue. Reininga also is a member of the College of Engineering Advisory Board and the Engineering Building Campaign Committee.

Curtis A. Achenbach (B.S.Ch.E. '66) lives and works in Corpus Christi, Tex., where he is vice president for operations planning at American Chrome & Chemicals.

Richard L. Fix (B.S.Ch.E. '66) is a managing partner at Henderson & Sturm, an intellectual property law firm with offices in Washington, D.C., Omaha, Des Moines and Davenport. Fix, who earned an M.B.A. at Iowa in 1967, works in the firm's Des Moines office and works in West Des Moines with his wife, Janet.

L.D. McMullen (B.S.C.E. '68, M.S. '72, Ph.D. '75) has been elected to The University of Iowa Alumni Association board of directors. He also chairs the College of Engineering Advisory Board. McMullen spent three days last summer at the college, visiting with department heads, center directors, and with the University's director of research marketing.

Craig R. McCollum (B.S.E.E. '69) is an electronics engineer for the U.S. Defense Information Systems Agency-Pacific, at Wheeler Army Airfield, Hawaii. McCollum, who has been employed by the government since graduating from Iowa, currently is working to develop and implement an integrated network management system for the defense information agency's regional control center. He lives in Waipahu.

1970s

Gary F. Seamans (B.S.E.E. '71) has been named High Technology Entrepreneur of the Year for the midwest region. The award is sponsored by Ernst & Young, the Kauffman Foundation, USA Today, and CNN. He also has been elected to the board of directors of the University of Iowa Foundation. Seamans, chair and CEO of Westell, Inc., of Oswego, Ill., chairs the College of Engineering Development Council and the Engineering Building Campaign Committee and is a charter member of the Distinguished Engineering Alumni Academy. He was profiled in the fall/winter 1995 Iowa Engineer.

Les Thede (M.S. '71) is a professor of electrical engineering at Ohio Northern University. He reports that he is author of Analog and Digital Filter Design Using C, published by Prentice Hall in 1996. Thede lives in Ada.

Jeffrey L. Peterson (B.S.C.E. '73) is a construction site manager for Monsanto, in Alvin, Tex. Peterson, who earned an M.B.A. in 1989 from the University of Houston—Clear Lake, lives in League City.

1980s

David M. Dechant (M.S. '80) has joined Howard B. Green Company as environmental department head for Cedar Rapids. Dechant is responsible for the management and continued growth of the city's environmental engineering department, whose services include water, wastewater, hazardous materials, solid waste, and air quality. Previously Dechant spent 16 years at CH2M Hill as a project engineer, project manager, and principal-in-charge in the firm's Denver and Tulsa offices. Dechant lives in Marion.

Sharon Kay Tinker (B.S.Ch.E. '80) is in Singapore "on a loan assignment" from Exxon Chemical Co. Tinker is working at Singapore Aromatics Private, Ltd., preparing for the startup of a new paraxylene and benzene aromatics plant. Her stateside address is Baytown, Tex.

Ting-Chung Poon (Ph.D. '82) lives and works in Blacksburg, Va., where he is professor of electrical engineering and director of the optical image processing laboratory at Virginia Tech University.

Gilberto E. Urruz-Aguilere (two M.S. degrees in '82, Ph.D. '86) has moved to Logan, Utah.

Mark J. Offenburger (B.S.E. in Che '84) has been promoted to manufacturing manager for Allied Signal's Florance, France, plant, which coats substrates in catalytic converters for the European auto industry.

Offenburger holds a patent for a composite zinc/alumina coating for corrosion protection, #4802867 (1989).

Richard Bray (B.S.E. in EE '85) is a systems engineer for United Defense, of San Jose, Calif., where he works in the horizontal technology integration department. Bray, who earned an M.B.A. at Iowa in 1988, is the Bay Area coordinator from the UI, with whom he writes, a lot of help from Rhett Livengood (B.S.E. in Che '85, M.S. '87). Bray lives in Sunnyvale.

Mohammad Reza Mirshamsi (B.S.E. '83) lives in Tehran, Iran.

Steve Britt (B.S.E. in EE '85, M.S. '87) lives and works in Roseville, Calif. He is a software design engineer for Hewlett-Packard.

Brad J. Frates (degree? '85) lives and works in Kanai, Alaska, as inspection group supervisor for Unocal Agricultural.

Maria Slavens (B.S.E. in En '85) has been named plant manager of General Mills, in Iowa City.

James P. Veggy (M.S. '85) has moved to Lincoln, Neb.

Michael D. Howard (B.S.E. in EE '86) has moved to Wilmette, Ill.

Brandon B. Engler (B.S.E. in Che '88) lives and works in Houston, Tex., where he recently joined M.W. Kellogg Company, an engineering and construction firm, as senior engineer II in refining process design. Engler writes that his wife, Andrea, is a chemical engineering graduate of the University of Washington and works for Shell Oil.

Mary Beth Klaft Kennedy (B.S.E. in BE '86) recently graduated from dental school at the University of Texas—San Antonio and is working as an associate dentist with Apple Dental, of San Antonio. Before enrolling in dental school, Kennedy spent six years working in biomaterials research and drug delivery systems at the University of Texas and at the University of Massachusetts Medical Center.

Kennedy writes that she has been married for nine years and has just given birth to her second daughter. She and her husband have opened an Irish pub and restaurant in San Antonio's downtown tourist district.

Gregory J. Kirsch (B.S.E. in EE '87) graduated from Washington University law school in 1990 and practiced patent law in Washington, D.C., until 1992, when he joined a general practice firm in Atlanta, Ga. In 1996 he became a partner at the Atlanta firm Needle & Rosenberg, P.C., where he and one of his partners head their firm's electronics and software patent and intellectual property practice.

Kirsch writes that his clients range from large multinational corporations to small start-up companies. He writes and speaks widely on copyright protection for computer software and in 1995 was an invited speaker at an international intellectual property law conference in Vienna, Austria.

Kirsch and his wife, Lanie, are the parents of a daughter, Amanda, born June 1995.

Joe Cummings (B.S.E. in BE '88) has moved to Wilmette, Ill.

Brandon B. Engler (B.S.E. in Che '88) lives and works in Houston, Tex., where he recently joined M.W. Kellogg Company, an engineering and construction firm, as senior engineer II in refining process design. Engler writes that his wife, Andrea, is a chemical engineering graduate of the University of Washington and works for Shell Oil.
Shankar G. Hemmady (M.S. '89) is president and CEO of Guru Technologies, Inc., of Santa Clara, Calif. Hemmady's wife, Seema, who in 1992 earned a Ph.D. in pharmacy at Iowa, is CFO and pharmaceutical scientist at the company, a high-tech consulting concern focused on the electronics and biotechnology industries. Hemmady reports that he and Seema cherish fond memories of their days at Iowa, and he even claims they've been to miss the snow! The Hemmady's live in Cupertino.

Monica Petersen (B.S.E. in CE '91) is a U.S. Peace Corps volunteer in El Salvador, where she works with poor farmers, women, and children to teach and promote reforestation, soil conservation, and environmental education. Petersen writes that she is a University of Montana master's degree candidate in international resource management and is writing a thesis on her El Salvador research as part of her degree requirements.

S. Keith Hargrove (Ph.D. '93) is an assistant professor of mechanical engineering at Tuskegee University, where he is serving as assistant to the dean for academic year 1996-97. Hargrove has been recognized by Who's Who Among America's Best Teachers for 1996.

Henry J. McGill (B.S.E. in BE '93) lives in Cincinnati, Ohio.

Mehrdad Mahmoud (B.S.E. in ME '94) enrolled at the University of Washington-Seattle after graduating from Iowa and earned an M.S. in 1996. In August he began work as a manufacturing engineer with Corning, Inc., of Wilmingon, N.C.

Peter Svebakken (M.S. '94) works in Fruitland, N.M., as an environmental engineer in BHP Minerals. Svebakken lives in Farmington.

Kai Wan Cheong (B.S.E. in ChE '93) is a project engineer at Greenwell Engineering in Perak, Malaysia, where he recently works on construction of an Amide chemical plant. Cheong reports that she enjoys working as an engineer and adds, "one is required to know more than engineering to survive in this field." She lives in Selangor.

Brian Eellsd (B.S. in CE '95) lives in Houston, Tex.

Jason Eellsd (B.S. in CE '95) has moved to Peoria, Ill.

Kuruvilla John (M.S. '89, Ph.D. '92) is an assistant professor of environmental engineering at Texas A&M University, where he teaches and conducts research in air pollution and air quality. He lives in Corpus Christi, Tex., with his wife, who also is an Iowagrad (M.B.A. '90).

Kandice Kae Halstead Thomp- son (B.S.E. in IE '96) lives and works in Muscatine, Iowa, where she is an industrial engineer for Hon at the company’s systems furniture plant.

### 1990s

Khar Yee Chua (B.S.E. in EE '90) is a product engineer at Northern Telecom Malaysia and is working toward an M.S. in telecommunication at University Petanian Malaysia. Chua lives in Kedah.

Ray C. Damaso (B.S.E. in ME '90, M.S. '92) lives and works in Cedar Rapids, where he has been promoted to project engineer at Collins Avionics and Communications Design. Damaso oversees design of global positioning system (GPS) receivers that are embedded in aircraft navigation equipment. He writes, "I'm excited that the Engineering Building is finally being modernized."

Tim Schneider (B.S.E. in ME '90) works in Muscatine, Iowa, as a project engineer in central plant engineering at Monsanto. Schneider and his wife and three sons live in West Liberty.

Jennifer Doran (B.S.E. in ChE '91) is a project start-up leader for a propylene expansion project at Exxon Chemical's Baytown, Tex., plant.

Vincent "Ted" Minette (B.S.E. in ME '91) is a sales engineer for the Kansas City, Mo., firm Millbank Systems, Inc. Minette does initial design and cost estimation of industrial finishing systems for power and liquid paint applications. He lives in Liberty.

Monica Petersen (B.S.E. in CE '91) is a U.S. Peace Corps volunteer in El Salvador, where she works with poor farmers, women, and children to teach and promote reforestation, soil conservation, and environmental education. Petersen writes that she is a University of Montana master's degree candidate in international resource management and is writing a thesis on her El Salvador research as part of her degree requirements.

Julie Vitello Sustics (B.S.E. in EE '91) works for the Chicago firm Bussmann Circuit Components, where she has been promoted from manufacturing to sales applications engineer and territory manager for the eastern United States. Sustics plans to complete an M.B.A. at Lake Forest College early in 1997.

Steve Andreitch (B.S.E. in ChE '92) lives and works in Plainfield, Ill., where he is a manager in process engineering at Conn-Weld Industries, Inc., a Princeton, N.J., company. Andreitch does engineering sales and consulting for Conn-Weld throughout the Midwest and the South. He previously worked for Cargill, Inc., in Cedar Rapids.

Rodney Bristol (B.S.E. in BE '92, M.S. '94) has moved to Cedar Park, Tex.

Lynn La Placa Heithoff (B.S.E. in IE '92) is an electrical estimator for MKK Technologies, Inc., of Livonia, Mich. She writes that she recently married fellow UI graduate Scott Heithoff (B.S. in exercise science '92) and insists she is a University of Montana graduate and is writing a thesis on her El Salvador research as part of her degree requirements.

Rob M. Thomas (B.S.E. in IE '92) is a process engineer for Lucent Technologies, Inc., in charge of all facets of manufacturing in two automated work cells. Thomas lives and works in Omaha.

K.N. Chung (Ph.D. '93) is a senior researcher in propulsion research at Hyundai Maritime Research Institute in Ulsan, Korea. He was one of the scientists there who met Mary Sue Coleman during the UI president's June 1996 trip to Korea.

### In memoriam

<table>
<thead>
<tr>
<th>Name</th>
<th>Title/Details</th>
<th>Date</th>
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</thead>
<tbody>
<tr>
<td>Paul W. Thompson</td>
<td>(B.S.C.E. '92), of Daytona Beach, Fla.</td>
<td>February 9, 1996</td>
</tr>
<tr>
<td>Edward B. Mair</td>
<td>(B.S.M.E. '34), of Battle Creek, Mich.</td>
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</tr>
<tr>
<td>Walter H. Lenz</td>
<td>(B.S.M.E. '32, M.S. '36), of Lone Tree, Iowa</td>
<td>February 18, 1996</td>
</tr>
<tr>
<td>Harry F. Freeman</td>
<td>(Ph.D. '40), of Miami, Fla.</td>
<td>March 17, 1996</td>
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<tr>
<td>Verne E. Anthony</td>
<td>(B.S.M.E. '42), of Pasadena, Calif.</td>
<td>August 9, 1996</td>
</tr>
<tr>
<td>Gerald R. Hutchix</td>
<td>(B.S.C.E. '43), of Cedar Rapids.</td>
<td>February 12, 1996</td>
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<tr>
<td>Benson A. Tuchschter</td>
<td>(B.S.C.E. '43), of Frederick, N.J.</td>
<td>February 29, 1996</td>
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<tr>
<td>Leslie H. Griffith</td>
<td>(B.S.M.E. '48), of Salt Lake City, Utah</td>
<td>July 4, 1996</td>
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<tr>
<td>George H. Holubek</td>
<td>(B.S.Ch.E. '48), of Muscatine, Iowa</td>
<td>September 10, 1996</td>
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<tr>
<td>Robert L. McFarland</td>
<td>(B.S.Ch.E. '50), of Sylvania, Ohio</td>
<td>January 1996</td>
</tr>
<tr>
<td>Paul A. Mutchler</td>
<td>(B.S.M.E. '50), of St. Louis, Mo.</td>
<td>May 18, 1996</td>
</tr>
<tr>
<td>Francis B. Callahan</td>
<td>(B.S.C.E. '52), of Davenport, Iowa</td>
<td></td>
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<tr>
<td>Myron Ray</td>
<td>(B.S.E.E. '58), of Israel</td>
<td></td>
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<tr>
<td>Jayendra G. Bharucha</td>
<td>(M.S. '63), of Lawrenceville, N.J.</td>
<td>February 11, 1996</td>
</tr>
<tr>
<td>Junichiku Ikuta</td>
<td>(B.S.E.E. '63), of Appleton, Wis.</td>
<td>August 9, 1996</td>
</tr>
<tr>
<td>Marvin M. Johnson</td>
<td>(M.S. '66, Ph.D. '68), of St. Joseph, Mo.</td>
<td>April 16, 1966</td>
</tr>
<tr>
<td>Martin J. Holmes</td>
<td>(B.S.E.E. '77), of South Pasadena, Calif.</td>
<td>July 19, 1996</td>
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<tr>
<td>Leon D. Blankenfeld</td>
<td>(M.S. '67), of Lakeville, Minn.</td>
<td>August 28, 1996</td>
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<tr>
<td>Richard R. Dague</td>
<td>former UI professor of civil and environmental engineering, of Ames, Iowa, October 15, 1986</td>
<td></td>
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<tr>
<td>Hunter Rouse</td>
<td>professor and dean emeritus of the college and former director of the Iowa Institute of Hydraulic Research, of Sun City, Ariz., October 16, 1996</td>
<td></td>
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</tbody>
</table>
Three college standouts take on expanded roles

Dean Richard K. Miller recently announced several changes in college personnel. In June, K.K. Choi, long-time professor of mechanical engineering, was appointed director of the Center for Computer-Aided Design. Choi, who received the 1996 College of Engineering Service Award in May, will serve a four-year term as CCAD director.

"The center is fortunate to have as its new director an individual with an outstanding research record," Miller said. "K.K. Choi has an unusually distinguished record of college service, and I'm very enthusiastic about working with him to build the research accomplishments of CCAD to new heights."

In September, Professor of Biomedical Engineering Malcolm H. Pope stepped into the role of department executive officer. Pope is a University of Iowa Distinguished Professor, a fellow of England's Royal Society of Medicine, and director of the Iowa Spine Research Center.

"Malcolm Pope brings extraordinary visibility to the position," Miller said, "and I look forward with considerable enthusiasm to working with him to advance the department and the college."

Pope succeeds A. Jacob Odgaard, professor of civil and environmental engineering and associate dean of the college, who served as acting director of the department before Pope's appointment.

In addition to these appointments, the college also has welcomed Larry Weber as an assistant professor of civil and environmental engineering and research engineer in the Iowa Institute of Hydraulic Research. In the fall, Weber taught statics and the core course in engineering.

Weber, who earned his bachelor's (1989), master's (1990), and doctoral (1993) degrees in civil and environmental engineering from Iowa, has been a member of the Hydraulic Lab research staff for three-and-a-half years. His work has focused on modeling of hydraulic structures, design and testing of fish passage structures along the Columbia River (see Iowa Engineer, fall/winter 1995), and cold regions engineering.

The college's Omicron chapter of Theta Tau professional engineering fraternity won several awards last August at the fraternity's national convention in Detroit. For the second time in 10 years, the UI chapter received the Erich J. Schrader Award, given biannually to the most outstanding chapter nationwide over a two-year period. The chapter also received an award for excellence in professional development.

Kendra Wyatt, Omicron regent and convention delegate, was honored as best student delegate. Wyatt, a senior from Shell Rock, Iowa, is the first woman to receive the award in the fraternity's 92-year history.

Biomedical Engineering

K. B. Chandran, professor, was elected in June to a four-year membership in the National Institutes of Health Surgery and Bioengineering Study Section.

Vijay K. Goel, professor, received the 1996 Distinguished Alumni Award from the Thapar Institute of Engineering and Technology in Patiala, India.

Malcolm H. Pope, professor and chair, was named 1996 visiting professor at the orthopaedics and traumatology department of the Chinese University of Hong Kong. Pope also spoke at the 1996 meeting of the National Athletic Trainers Association, in Orlando, Fla.

James DeVocht, graduate student, spoke in October at a National Institutes of Health conference, Uses of the Visible Human Dataset, in Washington D.C.

Jennifer Ocf and Michelle Sablick, graduate students, along with Michael Pence, senior in the College of Business Administration, won first place in an engineering design contest sponsored by the U.S. Olympic Committee's Sport Science and Technology Division (see story on page 18).

Civil and Environmental Engineering

A. Jacob Odgaard, professor and associate dean, was named special adviser for the Meghna Estuary Study in Bangladesh. The program focuses on surface/bottom vanes for erosion abatement.

Frank H. Weirich, associate professor, received the Distinguished Publication Award in May from the U.S. Department of Agriculture Forest Service Pacific Southwest Research Station. Weirich was recognized for his paper "Effects of Fire Severity on Nitrate Mobilization in Watersheds Subject to Chronic Atmospheric Deposition," published in Environmental Science and Technology.
Peter Vikesland, graduate student, received the Abel Wolman fellowship in May from the American Water Works Association.

Jason Wenger, senior from Cedar Rapids, in September was named Outstanding Senior of the Year by the Iowa Section of the American Society of Civil Engineers, at the section’s annual conference in Iowa City.

Scott Wright, graduate student, and Forrest Holly, professor and chair, presented a paper at RIVERTECH ’96, the first international conference on new/emerging concepts for rivers, held last September in Chicago.

Electrical and Computer Engineering
Sudhakar M. Reddy, professor and chair, in July was chosen to be inducted into the Computer Society Golden Core, an elite group of 500 influential members, by the Institute of Electrical and Electronic Engineers. The institute’s membership exceeds 250,000.

Industrial Engineering
Peter J. O’Grady, professor and chair, gave the keynote address at the 12th International Conference on Production Engineering, held in August at Tennessee Technological University, Cookeville.

Mechanical Engineering
Christoph Beckermann, professor, and Marc C. Schneider, former graduate student, received the 1996 Marcus A. Grossman Young Author Award in October from ASM International at the society’s Edward DeMille Campbell Memorial Lecture in Cincinnati, Ohio. Beckermann also received a four-year, $600,000 grant in June from the National Space and Aeronautics Administration to conduct a project using the space shuttle or the proposed international space station to investigate how properties of metals develop during solidification in the near-weightless environment of space. In August Beckermann and Richard Hardin, adjunct assistant professor, received a special medalion flown aboard the space shuttle Endeavor in September 1993. The medalion recognizes the scientists’ contribution to the Iowa joint Experiment in Microgravity Solidification.

K.K. Choi, professor, organized and chaired the Sixth Midwest Regional Korean-American Scientists and Engineers Conference, held in June in Iowa City. Choi founded the association’s Iowa City chapter. Choi also led a collaborative research agreement signed by the Korea Advanced Institute of Science and Technology (KAIST) and the College of Engineering’s Center for Computer-Aided Design (CCAD), which Choi directs. The agreement’s first phase will provide $150,000 to CCAD over two and a half years.

Jeffrey S. Freeman, assistant professor, last spring was chosen one of 21 outstanding engineering educators nationwide by the Society of Automotive Engineering’s 1996 Ralph R. Teeter Educational Award Program.

Ray P.S. Han, professor, was elected in April to the Technical Committee on Vibration and Sound, American Society of Mechanical Engineers design engineering division.

Joshua J. Horn, graduate student, received the H.O. Fuchs Student Award in October from the Society of Automotive Engineers fatigue design and evaluation committee. Horn presented his master’s thesis results at the committee’s meeting in Columbus, Ohio.

Ana Sirviente, graduate student, attended the National Science Foundation Engineering Education Scholars Program in July at the University of Wisconsin-Madison.

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