CCAD:
a model center

Iowa Engineering!

Engineers, by nature, are inquisitive, inventive, and intensely determined to make things work, particularly when faced with daunting challenges.

It is no surprise, then, that alumni and friends of The University of Iowa College of Engineering together pulled off a remarkable feat: raising more than $36.6 million—including outright and deferred gifts—as part of Good. Better. Best. Iowa: The Campaign to Advance Our Great University. Almost 5,000 contributors to the College of Engineering made gifts—ranging from annual contributions to major leadership gifts—through The University of Iowa Foundation during the campaign, which ran from January 1, 1999, through December 31, 2005.

Each of those gifts represented a commitment to the college’s mission of conducting visionary research; serving our state, nation, and the world; and educating students to become exceptional engineers . . . and something more.

Because the UI College of Engineering is always seeking new ways to lead and to provide our students and faculty with the resources required for them to do their best work, the need for sustaining the college through private gift support will always be a priority. However, now is a time to take a step back, marvel at what we’ve created together here in our college, and celebrate our extraordinary success as part of the Good. Better. Best. Iowa campaign.

Educating Students of National Distinction

The college’s central mission is preparing students for success in an increasingly competitive and global economy. That task begins by bringing the best and most deserving students to the UI by offering the financial assistance they need to succeed through merit- and need-based aid. Annual contributions of all sizes to the Engineering Excellence Fund continue to provide financial aid to students who need it—every single year.

In addition, during the campaign, contributors gave more than $3.7 million in designated gifts to support students, including the creation of 30 new scholarships and fellowships, such as the Dwight and Elsie Johnston Engineering Scholarship, established in 2003 by Grinnell, Iowa, residents Dwight L. Johnston (BS 1942 chemical engineering) and Elsie M. Johnston (BA 1944 home economics); and the Clifford and Nina Smith Engineering Scholarship, created in 2005 by Clifford V. Smith, Jr. (BS 1954 civil and environmental engineering), and Nina M. Smith, of Corvallis, Oregon, to name just two examples.

Cultivating Faculty of National Distinction

As the college continually strives to achieve even greater success in educating students and serving Iowa, the nation, and the world, it is essential that we attract and retain more extraordinary faculty—at all career stages—who can help the college fulfill its educational and research mission. Outstanding faculty support helps make the difference between programs that keep up and those that set the pace, and the continued addition of named and endowed faculty positions continues to be an important goal.

Early in the campaign, the Allen Henry Chair in Engineering set the bar for gifts in support of UI Engineering faculty. The $1.5 million Henry Chair endowment is the second largest gift ever given to the College of Engineering. Allen S. Henry received his master’s and doctoral degrees in mechanics and hydraulics from the UI in 1968 and 1971, respectively, and was inducted into the college’s Distinguished Engineering Alumni Academy in 2000.

Including the Henry Chair, contributors gave more than $5 million during the campaign to support faculty, including the establishment of nine prestigious endowed faculty positions—proving that UI College of Engineering alumni and friends fully acknowledge the importance of top-tier faculty when it comes to supporting and empowering the program.

Annual gifts to the Engineering Excellence Fund also help make it possible for faculty to take advantage of special

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Message from the Dean

If knowledge and learning are the products of higher education, then research continues to be the driving force of both. High quality research is central to the mission of the College of Engineering, to both advance the enterprise and to engage all students—undergraduate and graduate alike—in research laboratory work and studies.

The College is proud of its production of a substantial volume of innovative research and of its role in preparing engineering leaders equipped with masters and doctoral degrees. National publications have consistently ranked the quality of undergraduate and graduate education at the College among the top 20% institutions nationally.

The College does not strive to be the biggest or most comprehensive among engineering colleges. Rather it seeks to focus its efforts and resources in areas of unique strength where true distinction is attainable. Research focus areas include computer simulation, human factors and cognitive research, environmental health solutions, biotechnology, medical imaging, hydraulics and water/air resources, and photopolymerization. These are based on substantial faculty strengths in the College and are well positioned for addressing emerging national needs.

To date, College faculty members hold more than 40 patents and are responsible for more than $28.9 million in College and interdisciplinary annual research expenditures—approximately $348,000 per faculty member. That is more than a 70% increase from a decade ago.

We are on a path to make research as great a driver of high quality education as ever.

P. Barry Butler, Dean
Now in its 25th year, the Center for Computer Aided Design (CCAD) has much to celebrate. An interdisciplinary research center housed in the College of Engineering, CCAD conducts basic research on modeling and simulation with a focus on design, optimization, and computational mechanics for structures, vehicles, and mechanical and biomechanical systems. From the outset, technology transfer has been an essential part of CCAD's mission, and the center has licensed millions of dollars worth of research products to its academic, industrial, and government clients.

Directed by Professor of Biomedical Engineering Karim Abdel-Malek, the center comprises more than 150 researchers, including faculty members, professional staff, scientists, and graduate and undergraduate students. The facility's world-class research has attracted considerable external funding in recent years. Industry and government grants recently have skyrocketed from $1.3 million in 2002 to more than $9 million today.

"I'm extremely bullish on CCAD and its potential for even greater things," says Jack Harris (BS 1981 in mechanical engineering), director, advanced manufacturing technology at Rockwell Collins, Inc. and chair of the center's advisory board. "The center is well on its way to being one of the world's premier R&D facilities in the development and integration of state-of-the-art modeling and simulation tools and techniques."
Tom Schnell, CCAD director of project development (left) and Steve Beck (right) CCAD research & development manager. Photo by fisheye.
How can engineers design less distracting driving technology, and how can we design technology to monitor drivers, identify distractions, and help mitigate those distractions?

John Lee has something in common with successful poker players and car-pet salesmen: They all know that when people are excited about something, it shows in their dilated eyes. Card players and sales people leverage this information to measure their opponents and customers. As an engineer, however, Lee is more interested in studying dilated eyes and other expressive physiological phenomena to help determine how new technology mediates our relationship with the world.

In particular, the professor of mechanical and industrial engineering and director of the Cognitive Systems Laboratory (CSL) explores the intersection of technology and human behavior in the context of vehicle design. Does using “hands-free” phones really distract drivers less than using hand-held phones? How can engineers design warning systems to effectively alert drivers who fall asleep at the wheel? Once technological systems such as adaptive cruise control and automatic braking systems are incorporated into vehicles, will drivers use them appropriately?

New technologies such as satellite radio, DVD players, and global positioning systems enhance the driving experience, but they also can distract drivers...
and undermine safety. Safety also can be compromised by inappropriate use of technologies designed to help drivers recognize and avoid danger, including automatic braking systems that can avoid spinouts on ice and adaptive cruise control that can sense obstacles ahead and adjust vehicle speed accordingly.

“Good driving means more than just automatic braking and steering,” Lee says. “It also requires a driver to manage and use these new technologies appropriately.”

For instance, when carmakers began outfitting new cars with automatic braking systems about ten years ago, many drivers continued to pump their brakes when in an icy skid—just as their driver’s ed teachers had taught them. But to be effective, the new technology required that the driver do just the opposite and press down firmly and steadily on the brakes. With old driving behaviors so ingrained in most drivers, braking hard in an icy skid had become almost counterintuitive.

“In the Cognitive Systems Lab, we are looking at two basic kinds of questions,” Lee says. “First, how can engineers design less distracting driving technology, and, second, how can we design technology to monitor drivers, identify distractions, and help mitigate those distractions?”

The process of monitoring might include trying to determine when a driver becomes interested or excited about something, a cognitive phenomenon whose physiological manifestations—dilated eyes, for instance—may indicate distraction from the driving task at hand. To help determine when and how a driver gets distracted, Lee and his staff use instrumented vehicles on the road to monitor where drivers look as they drive and to scan their eyes to see when they dilate. In related research, Joshua Hoffman, one of five graduate students in Lee’s lab, is applying thermal imaging to measure blood flow to the face—another potential indicator of a driver’s cognitive state.

In addition to using several instrumented vehicles, Lee and his team also conduct their research on any of Iowa’s five driving simulators—one in the Engineering Research Facility, three housed at the National Advanced Driving Simulator, and one in the University of Iowa Hospitals and Clinics. They gather data, feed it to algorithms, then develop cognitive models about driver distraction that can arise from many sources, including technology.

“Of course, we will never eliminate all distractions,” Lee says. “After all, for many drivers, that would mean eliminating the children in the back seat. But we can identify ways to mitigate those distractions and enhance driving safety.”

Lee notes that future research may focus on human control of unmanned vehicles, including farm tractors and harvesters. He also envisions a time when his cognitive systems team could collaborate with other CCAD researchers to provide a cognitive side to the virtual soldier, Santos™ (see article on page 12).

“Avatars like Santos™ could provide the physical component to better understand cognitive abilities like memory and learning,” Lee says.

In the meantime, Lee will continue to study real humans in instrumented vehicles and simulated settings—work that doesn’t merely light up his eyes, but dilates them too.
The interaction between the vehicle and the road is very complex, but we have the capability to accurately recreate the sensation of movement as it is transferred from the pavement through the vehicle to the driver.

Above: The NADS simulator weighs in at 3 tons and creates synchronized motion, images and sound to simulate highly realistic driving scenarios.

Right: The simulator position when the driver (left to right) accelerates, turns, and brakes.
When the National Highway Transportation Safety Administration (NHTSA) decided to develop the world's most sophisticated vehicle dynamics simulator, it chose the Los Angeles firm TRW, a major player in large aircraft construction, to build the massive, $48 million machine. When TRW sought a powerhouse engineering team to create the complex software to "drive" the simulator, it chose a team of researchers at CCAD.

When NHTSA decided to locate this national facility, it chose The University of Iowa campus because of the long and successful history in modeling and simulation. The partnership produced the National Advanced Driving Simulator (NADS), an engineering team and facility that provide the world's highest-fidelity simulation for research into highway safety, motor vehicle systems research, and human driving behavior. Housed in a 40,000-square-foot facility at The University of Iowa's Oakdale Research Park, the two large simulators and portable mini-sim are supported by a full-time staff of thirty-four—including seven individuals dedicated to maintenance and operations—and eight students.

"The University has a strong tradition of excellence in driving simulation as well as in vehicle dynamics," Senior Team Leader Omar Ahmad (BA 1993 and MA 1995 in computer science) says. "That expertise has catapulted NADS to a world leadership position."

Cross-disciplinary research at NADS enhances the safety of American vehicles and highways. Since opening its doors in 2001, the facility has hosted dozens of researchers investigating an array of questions, including the influence of cell phone use on driving behavior, the effect of changing lanes on driving safety, and the impact of advanced automobile technologies on driver control. Recently NHTSA funded a $2 million NADS project to determine the effectiveness of electronic stability control (ESC) systems on automobile safety. The systems, which have been standard on European cars for several years, apply braking action and power to help prevent drivers from losing control of their cars. NADS researchers examined the impact of ECS on the driving behaviors of 500 subjects of various ages. The accident-avoidance systems proved so effective that as of 2010, the federal government will require most new American passenger vehicles to include ECS as standard equipment.

The ECS research was conducted in the NADS-1, a three-ton behemoth that creates synchronized motion, images, and sound to simulate highly realistic driving scenarios. A 24-foot high projection dome can accommodate a full-sized car, several models of which are in the NADS shop. The dome rests on a turntable that rotates 330 degrees and provides 13 degrees of freedom—in other words, virtually any sensation of motion actually experienced while driving a real vehicle. The entire setup is attached to a 64-foot-square motion rail that simulates the sensation of sustained braking and acceleration as well as the motion experienced when driving across three lanes of traffic. And four hydraulic actuators can mimic the texture of almost any road, whether smoothed by new asphalt, glazed with ice, or dotted by potholes.

"This design provides an unprecedented level of fidelity," Ahmad says. "The typical driving simulator offers six degrees of freedom, but while roll, pitch, and yaw work fine if you're simulating airplanes, cars are a lot more complicated. The interaction between the vehicle and the road is very complex, but we have the capability to accurately recreate the sensation of movement as it is transferred from the pavement through the vehicle to the driver."

The facility also has a teaching mission and employs eight students, both graduate and undergraduate. In the engineering version of American Idol, Marshall Potter was "discovered" by CCAD Director Karim Abdel-Malek and Senior Team Leader Jeff Dolan when they heard his team's senior design presentation about a battery-powered wireless dead-bolt lock that can edit valid users. The two NADS researchers were so impressed by the senior in electrical and computer engineering that they invited him to join the NADS staff.

Potter, who spent last semester as a co-op student at Maytag Corporation, says "For me, working at NADS has been a nice combination of using the tools I've learned in school while working somewhere that's pretty exciting—and unique."
MORE THAN A
bird’s eye-view

The pilot fixes his gaze on the landscape beyond the cockpit windshield, a relatively flat expanse of terrain topped by a small ridge in the distance. Inside the cockpit, just to the right of the controls, an 8” touch-screen provides three graphic images—a forward-looking view from inside the cockpit, a profile view, and a view from above the airplane as it flies across the terrain. As fog rolls in and the evening darkens, the pilot searches for a leather flight bag, fishes out a flashlight and a flight chart, and then hears, “OK, you can stop now. You just crashed the plane.”

Crashing your plane—or in aviation vernacular, “Controlled Flight Into Terrain”—is a leading cause of aircraft loss and death in general aviation. Only 6,800 commercial planes are registered to fly in the United States, compared to about 211,000 General Aviation (GA) aircraft. The National Safety Transportation Board reports that approximately 1,400 GA aircraft crash annually, claiming an average of 510 lives. General Aviation for business and pleasure, therefore, is an important part of what goes on in our skies.

Tom Schnell should know. The associate professor of mechanical and industrial engineering and director of CCAD project development and its Operator Performance Lab (OPL) is a commercial pilot and instrument flight instructor, licensed to fly single- and multi-engine aircraft, certain business jet aircraft, and gliders. With a grant from NASA, Schnell and his team of about 15 research engineers and students are conducting human factors research to help increase general aviation (GA) pilots’ situation awareness while decreasing their workload. The OPL team has achieved this by developing a portable, low-cost vision system for GA aircraft that provides a synthetic window into the world surrounding an aircraft.

The Synthetic Flight Bag™ displays three images of the terrain and the aircraft in flight to help GA pilots navigate in conditions of reduced visibility. The display shows representations of the aircraft’s location relative to terrain and—in the form of a red color overlay—an indicator of where Controlled Flight Into Terrain could occur.

“We want to simplify navigation to the point where flying even in darkness or bad weather will be like following a highway in the sky,” says Schnell, who expects the new technology to become commercially viable soon.

While the Synthetic Flight Bag™ is an important contribution to flight safety, deployment and use of such advanced technology needs to be accompanied by proper pilot indoctrination and training. “Most pilots are used to flight charts and Visual Flight Rules,” Schnell says. “Even those pilots who are licensed to use Instrument Flight Rules will need training and practice—both in simulators and in aircraft—to maximize the benefits of advanced avionics displays.”

In addition to the Synthetic Flight Bag™ work station, Schnell’s “shop”
employs a Beech Bonanza A-36 flying laboratory, a Boeing 737-800 full flight deck simulator, and various other state-of-the-art simulators that the research team uses to investigate synthetic and enhanced vision, flight simulation, and pilot eye movements, and to assess situation awareness and pilot performance.

Students are an important part of the research team. Mike Keller designs software for flight and ground transportation simulators in OPL. A doctoral student in industrial engineering, he and Schnell co-direct the aviation research branch of OPL. “Working here has been a critical component of my professional development,” says Keller, who was invited to join the lab following an undergraduate internship with Rockwell Collins. “I’ve helped design cutting-edge flight deck displays for fixed and rotary wing aircraft and helped support flight tests across the country and internationally. Working in the lab also has taught me how to interact with the global research community, project sponsors, and fellow engineers.”

“Engineering students should be working on a high-end playing field to learn what they’ll need in the real world,” Schnell says. “They should understand that engineering in the real world is very labor-intensive, demanding, and challenging. It involves actually designing and building equipment, testing an idea numerous times, and continuing to push through until the project is completed successfully.”
In an increasingly competitive global economy, research that can improve not only the performance but also the reliability of equipment or product components can provide the critical margin of difference.
Nagi Gebraeel has a healthy interest in long life. Although one would expect that from a young scholar just starting his career in a world-renowned research center, Gebraeel’s interest in long life is his career. The assistant professor of mechanical and industrial engineering develops sensory-based technology that monitors—and thereby prolongs—the health of newly designed equipment and helps industrial partners determine the optimal time to inspect, order, and replace machine parts. As interim director of CCAD’s Reliability and Sensory Prognostic Systems (RSPS) division, Gebraeel oversees a team of six faculty members and their students who grapple with designs and manufacturing in which extremely small tolerances can mean the difference between reliability/longevity and catastrophic failure.

The technology for interpreting sensory data streams that Gebraeel and his students are developing helps users determine when to inspect equipment, what components need to be replaced, and what spare parts to order before they are needed. Deere & Co. is currently working with Gebraeel and co-investigators Associate Professor of Mechanical and Industrial Engineering Geb Thomas and Assistant Professor of Mechanical and Industrial Engineering Yong Chen to develop and test fail-safe systems for on-board sensors in its autonomous field harvester prototypes. Currently in the design and development stage, these machines will work without the benefit of a human in the driver’s seat; they will be, in fact, robots.

“You can see,” Gebraeel says, “why it would be important that the sensors on board—the radar, sonar, and laser systems—work consistently and reliably to guide the machine across the field and not into the neighbor’s field or across the road.”

RSPS researchers investigate and develop new reliability-based design optimization that can be incorporated into manufacturing processes. In an increasingly competitive global economy, research that can improve not only the performance but also the reliability of equipment or product components can provide the critical margin of difference for a safer, longer-lived, and more economically viable product. For manufacturers and users of military and industrial equipment and consumer products, the economic and human implications of this margin can be substantial.

In a project with the Naval Air Systems Command, for example, Gebraeel is attempting to predict the time of failure of electrical power systems on Prop-3 aircraft, with an eye toward examining the systems on other aircraft in the future. Data gathered by vibration sensors indicate wear and tear on power generator units and eventually will help manufacturers and users anticipate optimal replacement time.

Gebraeel joined the CCAD team in 2004 after earning a PhD from Purdue University. He chose Iowa for good reason. “CCAD is renowned for its research and facilities,” he says. “It provides great lab space and startup funding. Those things alone make it a fantastic place to work. But for me, what really makes it unique is the feeling of collegiality and teamwork that I sensed even during my first interview. The Center’s leaders inspire and support a coherence that helps everyone here do their best work.”

For left: Alaa Elwanely (left) and Nagi Gebraeel (right) in the RSPS lab. In the foreground are two sets of parts: the set on the right is new, and the set on the left has failed due to excessive wear of the bearing races. The machine in the background can vary speed of rotation and pressure on the pieces.

Photo by fisheye.

Left: A vibration spectrum, which plots the evolution of a bearing’s vibration frequency spectra as it degrades. Bearing-specific defective frequencies are extracted and used to develop vibration-based degradation signals.
He boasts a body in fighting trim—corded biceps, washboard abs, and a jaw that could shatter rocks. He can maneuver a giant earthmover and is at home in the cockpit of an F-16 fighter jet. Although three years old, he is virtually an adult. He doesn't smile much, but everyone seems to like him. His friends call him an "avatar," the Hindu word for the incarnation of a god. He is Santos™, the digital human.

Santos™ and his virtual environment serve as a comprehensive tool for simulating and assessing biomechanics, dynamics, and many other aspects of human effort in work and leisure environments. He is the centerpiece of the Virtual Soldier Research (VSR) project founded and directed by Karim Abdel-Malek, professor of biomedical engineering and director of CCAD. Since Santos™ was created three years ago, he has attracted more than $13 million of external funding, enabling CCAD's VSR Laboratory to collaborate in 15 areas of research with partners such as the US Army, Caterpillar, Inc., and USCAR, a consortium of American car manufacturers. The research focuses on a variety of human/product interfaces, including the prediction of motions needed to execute a task, the effect of protective clothing on performance, and the calculation of force and strength needed to accomplish a given job.

Not your ordinary virtual human, Santos™ is the first and most powerful example of an entirely new generation of realistic digital humans who can perform real-time tasks with remarkable autonomy and even learn from their mistakes.

"There are a variety of ways to analyze designs in a computer-aided design environment," says VSR Senior Project Manager Steve Beck, "including finite element analysis, vibration and harshness, and aerodynamics. What's missing is a way to analyze the human-in-the-loop in a computer-aided design (CAD) environment."

So, for instance, researchers using CAD designs before Santos™ was born had to pose a virtual mannequin much like they would pose a jointed doll on a chair—one limb at a time. Next, human factors experts would consult a formidable ergonomic handbook to assess whether the computer mannequin appeared to be posed the way humans would pose in a similar scenario. Using this handbook, researchers could program these virtual mannequins to perform complex movements such as bending an elbow or turning a wrist.

Santos™, however, boasts 109 degrees of freedom, which enables him...
to perform, predict, and assess a complex series of motions. He not only can carry out tasks in his virtual environment such as “Reach for the gear shift,” but he also can respond to questions such as, “Is this comfortable? Are you strong enough to lift that?” and even, “What should you do next?” Employing Santos™ allows researchers to study not simply movement but also choice.

In his early months, however, Santos™ always chose the easy way, and, says Beck, performed some tasks in “goofy” ways. For instance, if you asked him to reach behind his back to grab a tool, he would stare straight ahead and reach directly backwards, which was reasonable if the only goal was to minimize discomfort. It was not, however, very realistic.

“Humans just don’t do that,” says Beck. “If you ask someone to reach behind him, he will first turn his body to look at whatever it is he’s been asked to retrieve.”

So VSR researchers instilled a variety of cost functions into Santos™, including potential energy, effort, comfort, joint displacement, visual acuity, and visual displacement. Now the researchers can ask the virtual human to perform and assess a task based on one or more of these cost functions.

“Of course,” says Beck, “if you highlight the potential energy function alone he might well do the task, but he’ll try to lie on the floor while doing it!”

Modeled on commercially available body scans created by Eyetronics, a company that provides digital images for movies, Santos™ is a disarmingly “human” model. CCAD researchers such as Applications Developer Chris Murphy have achieved this verisimilitude by fine-tuning the character rigging that creates and controls both the hierarchy of Santos’s™ joints and the polygons that comprise his skin. He displays a remarkably sophisticated musculoskeletal structure, including skin that shrinks and stretches like human skin.

Like any good parents, the 37 members of the VSR team, including about 12 students, have big dreams for their offspring. One of their goals for Santos™ is to enable the researchers themselves—the real humans—to work alongside him in his own, virtual world. Once that threshold is crossed, humans and virtual humans will be able to team up and perform virtual tasks to help solve real-world problems.

A series of screen captures shows the movement of Santos™ skeleton and muscles as he raises his left arm.
The Ethnic Inclusion Effort for Iowa Engineering unveiled a new website July 10. The site features research and trends, inclusion innovations, sponsorship, and achievements of the program. (http://www.engineering.uiowa.edu/ethnic-inclusion/)

The College of Engineering posted an 86.8% increase in research grants and contract awards for the 2005-2006 fiscal year; moving from $13.5 million last year to $25.3 million this year. Total number of awards increased 25.2%, from 127 to 159. Seven Engineering faculty members surpassed $1 million each in research grants and contracts during the year. They are Karim Abdel-Malek, professor of biomedical engineering and director of the UI Center for Computer-Aided Design (CCAD); Greg Carmichael, Karl Kammermeyer Professor of Chemical and Biochemical Engineering, associate dean, and co-director of the UI Center for Global and Regional Environmental Research; Tom Casavant, Roy J. Carver Jr. Chair in Bioinformatics and Computational Biology professor of electrical and computer engineering and biomedical engineering, and director of the Center for Bioinformatics and Computational Biology; Michelle Scherer, associate professor of civil and environmental engineering and investigator of environmental assessment at the UI; William Eichinger, professor of civil and environmental engineering and director of IIHR; and Larry Weber, associate professor of civil and environmental engineering and director of IIHR-Weber, in total, topped the entire University researcher list with funding that reached $7,326,493.

The August 20 issue of the Corridor Business Journal featured a commentary by Dean P. Barry Butler on how Iowa is preparing to meet the challenges of a growing global economy through well-thought-out education policies and initiatives. (http://www.engineering.uiowa.edu/news/corridor-op-ed.pdf)

Three areas of key Engineering research were featured at the University of Iowa exhibit at the Iowa State Fair held August 10-20. Al Ratner, assistant professor of mechanical and industrial engineering and director of the Combustion and High Speed Fluid Mechanics Lab and student Kevin O’Donnell demonstrated how combustion, David Wilder, associate professor of biomedical engineering and senior research scientist in the Jolt/Vibration Seating Lab of the UI Iowa Spine Research Center, presented information and advice on the topic of “Oh! My Aching Back.” Tom Schnell, associate professor of mechanical and industrial engineering and director of the Operator Performance Laboratory at CCAD and Carl Richey, engineering advisor on student projects by Board Beckling, Greg Neiswander, and Nathan Klemmef presented a demonstration on “Synthetic Vision: Using Computers to Aid Pilots in Flying Aircraft Under Low Visibility Conditions.”

The College Career Professionals of Iowa and the Iowa Association for Internships and Cooperative Education sponsored a joint Summer Conference held at The University of Iowa July 12-13. Phil Jordan, director of professional development, and Kelli Goedken, associate director of professional development, were conference coordinators. Bob Chiusano, executive vice president of Rockwell Collins and College of Engineering Alumni Board member, gave the keynote address.

The College of Engineering Professional Development Office has achieved a 97.75% placement rate for May 2006 BS degree graduates three months after graduation. The results are based on a response rate of 90.5%. Rebecca S. Rowe, administrative assistant, Dean’s Office, received the first Mary Sheedy Staff Excellence Award. The award recognizes Sheedy, longtime secretary to the Dean from 1929-1969.

Biomedical Engineering
A multi-disciplinary team received a five-year, $1.6 million grant from the National Institutes of Health (NIH) for the study of lung mechanics. Team members include principal investigator Joseph Reinhardt, associate professor of biomedical engineering and co-investigators Gary Christensen, Robert and Virginia Wheeler Faculty Fellow of Engineering and associate professor of electrical and computer engineering, Eric Hoffman, professor of radiology, and Geoffrey McLennan, professor of internal medicine. Both Hoffman and McLennan are from the UI Carver College of Medicine. The project will use computed tomography imaging to study lung mechanics in normal subjects as well as in patients with chronic obstructive pulmonary disease, a degenerative lung disease affecting millions of individuals.

Christina Rabink, a senior in biomedical engineering, received the Exceptional Summer Student Award from the National Institutes of Neurological Disorders and Stroke. The award was presented August 4 at the National Institutes of Health Clinical Center.

James Ankrum, a senior of Eldora, Iowa, was named to the 2006 UI Homecoming Court. During the Friday night pep rally on the Pentacrest, he was announced as Homecoming King.

Nicole Grosland, assistant professor of biomedical engineering and researcher at CCAD, was awarded a four-year, $1.98 million grant from the National Institute of Biomedical Imaging and Bioengineering of the NIH to develop a software toolkit to help physicians better understand the behavior of human bones and joints.

Chemical and Biochemical Engineering
Jennifer Fiegel recently joined the Department of Chemical and Biochemical Engineering as an assistant professor. She will hold a joint appointment in the Division of Pharmaceutics, College of Pharmacy. Fiegel earned her BS in chemical engineering in 1998 from the University of Massachusetts in Amherst, Mass. Upon completion of her undergraduate degree, she enrolled in the PhD program in Chemical and Biomolecular Engineering at Johns Hopkins University. Prior to joining The University of Iowa, Fiegel was a member of the laboratory of David Edwards in the Division of Engineering and Applied Sciences at Harvard University. She will be initiating a research program in engineering improved nano- and micro-structured pulmonary drug delivery systems for effective treatment and prevention of inflammatory and infectious diseases.

Vicki Grassian, professor with a joint appointment in chemistry in the College of Liberal Arts and Sciences and in chemical and biochemical engineering, was named director of the newly formed Nanoscience and Nanotechnology Institute (http://www.uiowa.edu/~nniu/). The institute will include more than 30 core researchers from six UI colleges already engaged in more than $6 million of nanotechnology-related research.

Charles Stanier, assistant professor and assistant research engineer at IIHR, was named the recipient of the 2006 Sheldon K. Friedlander Award by the American Association for Aerosol Research.

Linda Wheatley, secretary, received a University of Iowa Outstanding Staff Award. Her nominator, John Wienen, recognized her as a crucial element of the administrative structure of the program and “as a glue that keeps the faculty working as a team.”

Civil and Environmental Engineering
George Constantinescu, assistant professor and assistant faculty research engineer at IIHR, was awarded a $45,253, one-year research grant by the Iowa Department of Transportation to study an improved method for determining wind loads on highway sign and traffic-signal structures.

Continental Crossings, a small team of seven students, has chosen to combine their extramural interests with the engineering curriculum to create an augmented senior-design project. The main goal of the project is to provide assistance to those in the developing world by designing and building a standardized foot-bridge in Peru. Given the unique nature of the project, the group must raise funds for all travel costs and construction materials for the initial prototype. The team will create drawings and an erection manual for bridge replication, guided by the non-profit organization Bridges to Prosperity, which has offered coordination assistance in their effort. The five team members will also be responsible for on-site surveying, material selection, and the result design, which will be built with local labor. The projected time commitment is over 500 hours. Team members are: Irudn A-wan, Avery Bang, Jenna Kusmierczuk, Tara Olszyn, and Ryan Wallace.

William Eichinger, professor, faculty research engineer at IIHR, and
Jerry Schnoor, Ul Researchers in engineering and The University of Iowa chapter Electrical and Computer Jr, MD, professor of neurology and the NIH to advance medical and Lucille A. Carver College of director Lab of Computational sor and departmental executive co-investigators associate professor; will serve as Medicine. The study called NIREP Neuroanatomy in the Ul Roy J. year; $940,000 grant from the principal investigator along with imaging. National Institute of Biomedical medicine have received a three- Washington, DC. World College of Engineering Career Fair; Conference, September 24-27; the Showcasing Emerging Technologies” conjunction with the September Friends Energy Management Energy and Sustainability:pus. The conference was held in September 27-30, on the Ul cam­ 2006 national ESW conference, Graduate Fellowship Conference held September 25–26 in Washington, DC. The University of Iowa chapter of Engineers for a Sustainable World (ESW), hosted the 2006 national ESW conference, “Envisioning Sustainability: A New Generation of Thinking for the Next Generation of Living,” September 27–30, on the Ul campus. The conference was held in conjunction with the September 24–30 “Week of Renewable Energy and Sustainability: Showcasing Emerging Technologies” that includes the Big Ten and Friends Energy Management Conference, September 24–27; the College of Engineering Career Fair, September 28; and the Ul Energy Expo 2006, September 27.

Electrical and Computer Engineering
UI Researchers in engineering and medicine have received a three-year, $940,000 grant from the National Institute of Biomedical Imaging and Bioengineering of the NIH to advance medical imaging. Gary E. Christensen, associate professor, will serve as principal investigator along with co-investigators Jon Kuhl, professor and departmental executive officer; and Thomas J. Grabowski Jr, MD professor of neurology and director; Lab of Computational Neuroanatomy in the Ul Roy J. and Lucille A. Carver College of Medicine. The study called NIREP (Non-Rigid Image Registration Evaluation Project) is aimed at developing better methods to evaluate medical imaging systems. Mechanical and Industrial Engineering K.K. Choi, Roy J. Carver Professor of Mechanical Engineering, and researcher at CCAD, received the 2006 Design Automation Committee Award at the American Society of Mechanical Engineers 2006 International Design Engineering Technical Conferences & Computers and Information In Engineering Conference held September 11-13 in Philadelphia, Pa. Iowa football offensive lineman Mike Elgin, a senior from Bankston, Iowa, was named to the watch list for the 2006 Dave Rimington Trophy. The award is given each year to a player recognized as college football’s top center. Elgin has played center and guard on Iowa’s offensive line. He was a first-team all-American last year and had made the academic all-Big Ten team the last two years. He has been named to numerous 2006 pre-season, all-Big Ten teams.

Kyle Ellis, a senior from Coralville, Iowa, was one of eight UI seniors participating in the first Okoboji Entrepreneurial Institute July 30 through August 4 at the Iowa Lakeside Laboratory on West Lake Okoboji.

Center for Bioinformatics and Computational Biology
The Center for Bioinformatics and Computational Biology has formed an advisory board. Serving on the charter advisory board are: Abe Clark, director of glioma research, Alcon Laboratories, Fort Worth, Tex.; Lindsay Brechler (BS 1999 electrical engineering), Fastrieve Incorporated, a division of SOURCECORP, Overland Park, Kans.; Kyle Munn (BS 1997 biomedical engineering), MS 1999 electrical and computer engineering), computational biologist, EraGen Inc., Madison, Wis.; Andrew Peek, director of bioinformatics, Integrated DNA Technologies, Coralville, Iowa; John Quackenbush, professor of computational biology and bioinformatics, Harvard School of Public Health, Boston, Mass.; and Edwin M. Stone, professor of ophthalmology, The University of Iowa.

Center for Computer-Aided Design
The National Advanced Driving Simulator, a unit of CCAD, has a new website http://nads-sc.uiowa.edu. The site has information about research conducted there, people who support the simulator; the facilities, and technology transfer information. It also contains contact information, past and current projects, publications, answers to frequently asked questions and information for media.

IIHR—Hydroscience & Engineering
Three research engineers—Witold F. Krajewski, Rose & Joseph Summers Chair in Water Resources Engineering, William Eichinger, professor of civil engineering; and Anton Kruger, associate professor of electrical and computer engineering—are participating in a five-year, $1.3 million NASA grant to evaluate remote sensing techniques for estimating soil moisture and having the potential to help scientists better predict global water and energy cycles. The three are collaborating with research colleagues at Iowa State University and the US Department of Agriculture Agricultural Research Service’s National Soil Tilth Laboratory.

Pablo Carrica, adjunct associate professor of mechanical and industrial engineering and associate research engineer has received a two-year, $61,650 grant from the US Department of Defense, Department of the Navy. He will study integration of structural loads capabilities into CFDShip-Iowa.

Craig Just, adjunct assistant professor of civil and environmental engineering and associate research engineer; Anton Kruger; associate professor of electrical and computer engineering and associate research engineer; and Marian Muste, associate research engineer; received a two-year, $250,000 grant funded jointly by the NSF and the Consortium of Universities for the Advancement of Hydrologic Science to establish an environmental hydrologic observatory on Clear Creek in Johnson County, Iowa. Their work will build upon activities begun by Thanos Papanicolaou, associate professor of civil and environmental engineering and associate research engineer. The project will create a working example of cyberinfrastructure in the hydrologic and environmental sciences.
1950s

Luther H. Smith (BS 1950 mechanical engineering) received the UI Alumni Association Distinguished Alumni Award for Achievement in June. Smith, a Tuskegee Airman, was also inducted into the Iowa Aviation Hall of Fame, October 7 in Greenfield, Iowa.

Marvin Sedlacek (BS 1953, MS 1954 mechanical engineering) and wife Barbara of Surf City, NJ, were on campus October 9. During his employment with Aerojet he was assigned to the Titan project. Following the project he was employed with General Electric until his retirement.

1960s


Jin Wu (MS 1961, PhD 1964 mechanics and hydraulics) was named Distinguished Visiting Senior Scholar in the John W. Kluge Center at the Library of Congress. Wu will study Zheng He, a Chinese explorer and major figure in the history of navigation, and look at the scientific details of the voyages, such as navigation, shipbuilding, and logistics. He is a member of the IIHR—Hydroscience & Engineering Advisory Board.

Koladi Kripanarayanan (MS 1967, PhD 1970 civil engineering) was awarded the 2005 Peter Courtois Memorial Award for professional achievement by the Tilt-Up Concrete Association. Kripanarayanan, better known as Dr. Krip throughout the industry, authored "Tilt-Up-Load-Bearing Walls" and developed a comprehensive computer program that permitted construction of taller and thinner walls.

1970s

Rick Naber (BS 1970 civil engineering) and his wife Madelyn of Marble Falls, Tex., were highlighted along with their Texas winery, Flat Creek Estates, in the August Iowa Alumni Magazine.

Hong-Yuan Lee (MS 1982, PhD 1984 civil and environmental engineering), professor, National Taiwan University, Deputy Governor, Taipei County, Taiwan, and former commissioner, WRD Taiwan Provincial Government, was on campus August 18 to present an IIHR—Hydroscience & Engineering seminar titled "From Engineer, Professor to Politician—My Taiwan Experience." In September Lee hosted College of Engineering visitors in Taipei.

Kelly Ortberg (BS 1982 mechanical engineering) has been appointed executive vice president and chief operating officer of commercial systems at Rockwell Collins, Inc., Cedar Rapids. He is responsible for the company’s aviation electronics, communications and cabin systems for the air transport, business aviation, and regional airline markets.

Matt Ward (BS 1984 chemical engineering) has been named plant manager of the Monsanto Company’s Muscatine plant.

Lisa Friis (BS 1985 biomedical engineering, MS 1987 mechanical engineering) assistant profes-
sor of mechanical engineering at the University of Kansas in Lawrence and partner in Sunflower Biotechnology Group LLC, was named an entrepreneur "innova
to" for the Kansas Technology Corporation’s PIPELINE (Promoting Innovation, Providing Education & Leadership Investing in New Entrepreneurs) program.

Jody Howard (BS 1986 electrical engineering) has been appointed director of social responsibil-
ity for Caterpillar Corporation, Peoria, Ill. Howard will oversee worldwide employee safety and environmental protection for the company. Howard also is completing a several-year stint as site purchasing manager at Grenoble / Mec-
Track / EDC-Wackersdorf, Global Purchasing Europe, for Caterpillar. She is a member of the College of Engineering Advisory Board.

Greg Kirsch (BS 1987 electrical engi-
neering), attorney and shareholder with Needle & Rosenberg, Atlanta, Ga., was an invited speaker at the Intellectual Property Rights in the Financial Services Sector conference in London, England. He presented "Practical tips and strategies for pursuing patents for financial services inventions." Kirsch was also listed in The Best Lawyers in America® 2007. He is a member of the College of Engineering Advisory Board.

John Lemkul (BS 1988 electrical engi-
neering) of Tokyo, Japan, hosted a luncheon for University of Iowa visitors Professors V.C. Patel L.D.
Chen, Dean P.Barry Butler, and Kate Metcalf, assistant director of development, UI Foundation.

1990s

Kristen Jakobsen Osenga (BS 1994 biomedical engineering) joined the faculty of the University of Richmond School of Law as an assistant professor, where she teaches and writes on patent law and intellectual property.

Alyse Stoler (BS 1997 biomedical engineering) was the recipient of a Distinguished New Engineer Award at the Society of Women Engineers National Conference held October 12-14 in Kansas City, Mo. The award honors women engineers who have been actively engaged in engineer-
ing, have demonstrated outstanding technical performance, and have had no more than 10 years of cumula-
tive engineering experience.

Kelvin Gregory (MS 1997, PhD 2002 civil and environmental engineering) joined the faculty in the Department of Civil and Environmental Engineering at Carnegie Mellon University. His special field of knowledge is environ-
mental biotechnology, and his present research interests are in biological energy production for decentralized electricity needs.

2000s

Brad Baer, PE (BS 2001 civil engineer ing) transitioned from assistant public works officer, Marine Corps Base Camp Pendleton, Calif., to Amphibious Construction Battalion ONE in Coronado, Calif. This is his third tour of duty as a US Navy civil engineer corps officer.

Kendra McCoy (BS 2001 industrial engineering) is the Labor Relations Representative for Caterpillar Inc., Joliet, Ill. Kendra has been working for Caterpillar since January 2002 and completed the Manufacturing Professionals Development Program at the end of 2004. In her current role, she is part of the Human Resources Department and handles issues related to operations supervisor training, employee communications, and facilitation of the labor agreement.

Jaron J Christoph (BS 2002 industrial engineering) is employed as a senior industrial engineer with Rockwell Collins, Cedar Rapids, Iowa.

Ben Ratcliff (BS 2003 industrial engineering) stopped in Lawrence during the Ames Register’s Annual Great Bicycle Ride Across Iowa (RAGBRAI). He is employed with Accenture, Inc. and is currently working on a project in San Francisco, Calif.

Ori Sivan (BS 2004 civil engineering) is president and co-owner of Greenmaker Supply, a Chicago distributor and retailer that won a 2006 Innovate Illinois award in the environmental category. The company offers low-impact products, from non-toxic paints and stains to energy-efficient windows and recycled glass tile. Sivan was on campus September 27-30 to participate in the UI 2006 Energy Expo and the Engineers for a Sustainable World National Conference.

1930s


Allan A. Blatherwick (BS 1936 Electrical Engineering) of Minneapolis, Minn.

Doro B. Perez (BS 1936 chemical engineering) of Mexico.

Philip E. DeVoe (BS 1937, MS 1938 chemical engineering) of Cedar Rapids, Iowa, September 19, 2006.

Robert I. Hale (BS 1937 mechanical engineering) of Sun City, Calif., March 2006.

Joe Safra (BS 1937 electrical engineering) of Istanbul, Turkey.

Roberto Lopez Fabrega (BS 1938 civil engineering) of Panama City, Panama.

James B. Vernon (BS 1938, MS 1939 mechanical engineering) of West Covina, Calif., on October 31, 2005.

1940s

George Katres (BS 1941 electrical engineering) of Sioux City, Iowa, January 25, 2005.


Robert R. Meardon (BS 1948 mechanical engineering) of Glen Head, N.Y., February 6, 2005.

Edward P. Wright (BS 1948 mechanical engineering) of Etowah, N.C., May 12, 2006.


William M. Pahel (BS 1949 electrical engineering) of Forest, Va., May 2005.

1950s

Maynard K. Bennett (BS 1950 electrical engineering) of Sioux City, Iowa, December 12, 2005.


Donald B. Hamer (BS 1952 mechanical engineering) of Saint Charles, Mo., December 31, 2005.


Edward E. Byrnes, Jr. (BS 1953 mechanical engineering) of Willow Street, Pa., August 23, 2006.


1960s


Joseph L. Riley (MS 1964 electrical engineering) of Indianapolis, Ind., June 24, 2006.

1970s


1980s

This honor roll gratefully recognizes graduates, faculty, and friends who contributed $100 or more from January 1, 2005, through June 30, 2006, to the College of Engineering through The University of Iowa Foundation, the preferred channel for private support of all areas of the University. High-level annual contributors to the college's Engineering Excellence Fund and other college funds are acknowledged in several recognition clubs followed by a list of all other contributors to the college.

Contributors to the College of Engineering who were members of The Presidents Club prior to July 1, 2006, are listed in bold type in the College of Engineering Contributors section. The Presidents Club permanently recognizes the most generous contributors to The University of Iowa.

**The College of Engineering 1847 Society**
The following living alumni and friends have informed the UI Foundation of their intent to provide a deferred gift, of any size, to benefit The College of Engineering (and approved this public listing in the honor roll of contributors). Members of the College of Engineering 1847 Society prior to July 1, 2006, include:

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**College of Engineering Contributors**
Those who contributed to the College of Engineering from July 1, 2005, through June 30, 2006, are listed alphabetically below according to the level at which they gave.

**Dean's Club**
The Transit Club recognizes those who contribute (individually or jointly with their spouses) from $500 through $999.99 annually to the Engineering Excellence Fund or other college funds. The following alumni and friends provided support at the Transit Club level from January 1, 2005, through June 30, 2006:

Transit Club
The MECCA Club recognizes those who contribute (individually or jointly with their spouses) from $250 through $499.99 annually to the Engineering Excellence Fund or other college funds. The following alumni and friends provided support at the MECCA Club level from January 1, 2005, through June 30, 2006:

**MECCA Club**
Additional individual contributors of $100 through $249.99 and corporate contributors of $100 through $999.99 to the College of Engineering from January 1, 2005, through June 30, 2006:

The Engineering Associates include corporations, foundations, and other organizations that contribute $1,000 or more annually to the Engineering Excellence Fund or other college funds. The following contributors provided support at the Engineering Associates level from January 1, 2005, through June 30, 2006:

**Engineering Associates**
To Send Your Gift

The Engineering Excellence Fund is a college-wide resource that strengthens a variety of educational programs and activities for undergraduate and graduate students and helps to maintain excellence throughout the UI College of Engineering.

To contribute to the Engineering Excellence Fund, please send your check, payable to The University of Iowa Foundation, to the address shown. Thank you.

Corrections

The recognition extended to those listed in this honor roll is one small way to thank contributors. Every effort has been made to ensure that this honor roll is accurate. If your name has been omitted, misspelled, or misplaced, we apologize. Please contact the UI Foundation with any questions or corrections.

Thank you!

For More Information

If you would like more information about private support for the College of Engineering, Kevin Collins, the UI Foundation’s executive director of development for the College of Engineering, would be happy to work with you. You may contact him at:

The University of Iowa Foundation
Levitt Center for University Advancement
P.O. Box 4550
Iowa City, Iowa 52244-4550

(319) 335-3305
or toll-free (800) 648-6973

E-mail address:
kevin-collins@uiowa.edu

Web page:
http://www.givetoiowa.org/engineering
opportunities—such as presenting at a conference or traveling for a research opportunity—as they arise.

Creating Programs of National Distinction

Extraordinary education and ground-breaking research occur within innovative programs established by the college, often with the help of private supporters. These programs—such as the Caterpillar Engineering Colloquium series, the Herbert E. Storer Engineering Student Entrepreneurial Start-Up Award, and the Randall and Barbara Meyer Innovation Fund, to name just a few—are the heart of the college’s curriculum.

In perfect step with the college’s goal to educate engineers who are also “something more,” Tom Hanson—a 1960 mechanical engineering graduate of the college—and his wife, Nancy, of Hinsdale, Illinois, endowed the Hanson Center for Technical Communication. Established in 2004, the center offers engineering students a comprehensive resource for developing communication skills as part of their engineering education. Centers like this are part of a growing trend, and something we’re proud of at The University of Iowa. For the second consecutive year, the UI is one of 16 institutions appearing in the 2007 U.S. News & World Report listing titled “Writing In The Disciplines,” which recognizes institutions that “typically make writing a priority at all levels of instruction and across the curriculum.”

During the campaign, contributors gave almost $8 million to help develop first-rate programs, including the creation of endowed programmatic funds and endowed research funds.

Building World-Class Facilities

A top-tier college requires an optimal learning, teaching, and research environment. Thanks to the help of private contributors, our college offers just that, with the Seamans Center for the Engineering Arts and Sciences, the C. Maxwell Stanley Hydraulics Laboratory, and the Lucille A. Carver Mississippi Riverside Environmental Research Station near Muscatine, Iowa.

During the campaign, contributors gave more than $13.1 million to help build and renovate these and other facilities throughout the college.

What’s Next?

The Good. Better. Best. Iowa campaign has reached its successful conclusion, and that’s something to look back on with pride...but the demand to excel continues.

In the field of engineering, there is always something new to be discovered, and we will never run out of problems to solve. Thanks to our generous alumni and friends, the UI College of Engineering will continue to provide the best education possible for students who want to do just that.

For more information on supporting the UI College of Engineering, please contact:

Kevin Collins
Executive Director of Development
College of Engineering
The University of Iowa Foundation
P.O. Box 4550
Iowa City, Iowa 52244-4550
319-335-3305 / 800-648-6973
kevin-collins@uiowa.edu

On behalf of the students, faculty, and staff of the UI College of Engineering, The University of Iowa, and the UI Foundation I would like to express my heartfelt gratitude to all who supported the college during Good. Better. Best. Iowa: The Campaign to Advance Our Great University. Together, we are building a better future for students, Iowa, and the world. Thank you!

P. Barry Butler, Dean
The Rose & Joseph B. Summers Electronic Classroom at the College of Engineering has entered a new, pioneering era in computer teaching technology, termed to be the first of its kind anywhere. At the start of Spring Semester, specially designed and manufactured Hewlett-Packard laptop computers (selected because the classroom is used throughout the day for other classes that don’t employ personal computer technology) were installed by the College’s Computer Systems Support group to accommodate each of the 72 student positions in the classroom.

From previous experience teaching programming classes, Gary E. Christensen, Robert and Virginia Wheeler Faculty Fellow in Engineering and associate professor of electrical and computer engineering, witnessed how well students responded to learning programming using the computers during lectures.

“I think the classroom arrangement is a big success,” Christensen noted. “I have had a lot of positive feedback about the interactive nature of the lectures. Students are beginning to participate more as they gain confidence with their programming skills.”

“One of the great things is that students will write many more programs than in the old version of the class which used slide projection. They write small programs during almost every class,” he added. “They also are learning the mechanics of how to use the software tools.”

Planning, purchasing, and installation of the computers also provided a lesson in urgency. Christensen and the Computer Systems Support group—led by Director Doug Eltoft—rushed the project from start to finish in only 45 days, with minimal changes along the way. Normally the task would have taken six months, including ordering and building the laptops.

The Summers Electronic Classroom is named for the late Joe Summers (BS 1948 civil engineering) and his wife, Rose. Summers made a profound impact on water conservation and preservation in the water-starved West. For more than 40 years, Summers Engineering in Hanford, California, has provided consultation services to major irrigation and drainage projects around the world. Summers, who died in 2006, was honored as a member of the College’s Distinguished Engineering Alumni Academy (www.engineering.uiowa.edu/honor-wall/alumni-academy/members/summers.html) and received the 2002 University of Iowa Distinguished Alumni Award for Service. In fact, an “electronic” classroom was in Summers wishes from the start. Now, with the new laptop computers, this makes the classroom name even more relevant and important.