Virtually real

New University of Iowa group focuses on 3D printing … and more
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On the cover: Howard Chen holds a just-printed cellular scaffold.
More than just 3D printing

When President Barak Obama in his 2013 State of the Union address referred to 3D printing as one of several technologies helping to restart U.S. manufacturing, it got people’s attention nationwide.

Some of that attention is being focused on researchers at the University of Iowa College of Engineering’s Center for Computer Aided Design (CCAD) who have formed a new, interdisciplinary manufacturing venture called the Advanced Manufacturing Technology (AMTech) group.

One of the group’s two focus activities is electronics manufacturing, including the printed circuit boards found in hundreds of devices ranging from guided missiles to toasters. The other is 3D printing, which is being used worldwide to produce everything from chocolate candy to plastic toys to human organs.

It’s a combination of activities that AMTech co-director Tim Marler says finds his group in the right place at the right time. “When you look at the business environment nationwide and at CCAD, it’s a perfect time for the beginning of AMTech and the re-birth of U.S. manufacturing,” he says.

By now, you’ve probably heard that 3D printing has been used for years in factories to make aircraft parts, in college design classes to make plastic toys and in many other settings. But just what is 3D printing?

In short, it’s a system that creates objects by lacquering, or printing, one layer on top of another. First, a computer software program analyzes a desired object and visually divides it into thin layers. Then, at the push of a button, the computer program directs the printer to spray successive layers of a pre-determined substance—ranging from ink to plastic to chocolate and more—in layers to create a solid object.

Above: An expanded view of circuit-board layers for detailed 3D visual analysis.

Left: A “printed” blood vessel.
According to AMTech co-director Ibrahim Ozbolat, assistant professor of mechanical and industrial engineering and head of the biomanufacturing laboratory, the “ink” in the UI printer is made of human cells and the goal of AMTech’s 3D printing is distinctive and unlike any other being done in the state of Iowa.

“Our goal is to create a functioning human pancreas 5 to 10 years from now,” says Ozbolat, an Olympic award-winning mathematics student while in high school in his native Turkey.

He explains that the first step is to create, during the next two to three years, the part of the pancreas that produces the body’s supply of insulin. Insulin controls blood sugar levels and without it, a person develops diabetes. Next, clinical trials will follow, with patients donating their own cells, which are cultured and from which the 3D insulin-producing pancreas is printed. Individuals will receive their organs as implants in a convenient location, such as under the skin on the arm.

Not only is the objective of printing a human pancreas distinctive, but also the printer that will be used to create the human organ is unlike any other printer in the world.

Howard Chen, doctoral student in the Department of Mechanical and Industrial Engineering, created the printer from scratch in about six months using a design written under the supervision of Ozbolat. Chen, who grew up playing with Lego® bricks, says his invention was an extension of play.
“Building and working on the 3D printer is fun,” says Chen. “It’s just a grown-up version of playing with Legos®. I get paid to play with Legos® all day long.”

Dr. Yin Yu, physician and biomedical engineering graduate student, brings essential medical expertise to AMTech by preparing the 3D printer’s ink—a mixture of human cells, tissue spheroids and alginate, a substance derived from seaweed and long used in biological research, the food industry and many other fields. He is helping to perfect a process in which printed tissue will be supported by printed blood vessels. But even Yu admits he initially was surprised by the audacious goal of the 3D printing team.

“It sounded crazy when I first heard of it,” he says. “We’re using a printer to make human organs.”

To understand the uniqueness of the UI printer, you should know that printers capable of laying down multicellular structures have been around for about 10 years. But only the UI printer can perform the feat using multiple arms.

“Having multiple arms means that two or more arms can move as independently as the arms on the human body,” says Ozbolat. “The major advantage of the multi-arm bioprinter is that while one arm is making blood vessels, the other arm can be printing tissue-specific cells in between the blood vessels.”

“Bioprinters in some other places have one arm with multiple heads that can also be used to print multiple materials, but not concurrently. Because managing the arms without collision is difficult, other researchers have been using simpler configurations in terms of motion,” Ozbolat says. “This capability could significantly reduce the time needed to fabricate the organ.”

Ozbolat notes that at some future date when bioprinted organs have become routine replacements for damaged and diseased human organs, the time required to produce replacements could become very important. That’s because at any given time, thousands of people in the United States are awaiting organ transplants, but only a fraction successfully receive a replacement organ.

If the AMTech group achieves its goal of printing a human pancreas and significantly reduces the time needed to prepare organs for transplant, then the group could reduce or even eliminate the need for organ donor waiting lists.

When asked what challenges lie on the horizon and beyond the goal of creating a human pancreas, Ozbolat notes that pacemakers implanted under the skin of individuals with heart abnormalities have a limited battery life. It would be good, he says, to 3D-print a living replacement for the part of the heart that gives an electrical stimulus to the heart, thus entirely eliminating the need for a pacemaker. It can be done, he says.

Meanwhile, down the hall in the engineering research facility housing CCAD, researchers are working on the other half of the AMTech enterprise.

AMTech co-director Marler says that although it isn’t as dramatic as creating a human organ, electromechanical systems—the thrust he directs—is likely to have a significant impact on manufacturing.
“We want to simulate, test, and analyze circuit boards. That may not sound exciting, but circuit boards show up in cell phones, toasters, and missiles. Nearly everything that uses electricity today has at least one circuit board,” says Marler, who notes that his mathematics and mechanical engineering background led him to simulation studies.

“You don’t get many test cases with a missile,” he adds.

In fact, the current focus of the electronics manufacturing team grew out of a need expressed by the U.S. Department of Defense for a faster and cheaper way to design, test and analyze circuit boards in its systems, including missiles. In response, CCAD’s renowned Virtual Soldier Research (VSR) program, where Marler is an assistant director, developed a virtual testing program called PREVIEW (Predictive Environment for Visualization of Electromechanical Virtual Validation).

What does that mean in practical terms?

According to two UI undergraduate students who are working to improve PREVIEW, it means that AMTech may forever change the way electronic devices are manufactured and tested. The two electrical and computer engineering majors sit in front of 3D color computers where they can view circuit boards from different angles and test them with respect to electromagnetic interference, reliability and thermal properties.

They can even “swap-out” parts for cheaper components and test how the modified board would work—all without touching a real circuit board.

Ben Goerdt, a junior, says, “Lots of companies have aging circuit boards that are hard to maintain. We can pinpoint where future problem might arise.”

Senior Ben Weintraub says PREVIEW is a far cry from testing by hand, the way it’s done at most companies.

“We can conduct reliability tests between multiple circuit boards, and most computers have multiple circuit boards. Doing all of this on a computer saves time and money,” says Weintraub.

Herm Reininga, AMTech advisor, Director of the National Advanced Driving Simulator and longtime Senior Vice President of Operations for Rockwell Collins, says that the manufacturing group may change the entire electronics industry.

“A key phrase in industry is ‘time to market.’ That means focusing on the time it takes to bring a product from initial design to the marketplace,” says Reininga, who earned his Bachelor of Science Degree in Industrial Engineering from the UI College of Engineering, is a member of the college’s Distinguished Engineering Alumni Academy, and is a Leadership Council member of Next Generation Manufacturing Technology Initiative.

“Industry generally has three steps after design before a product comes to market. Testing is one of those steps and here at AMTech we can virtually test each part and component, so we are shortening the time to market. In addition, about 60 percent of electronics labor cost lies in testing, so we are lowering costs, too,” he says.
In summarizing AMTech’s role in the revitalization of U.S. manufacturing, Marler says the nation has learned that it makes sense to be involved in manufacturing, rather than outsourcing and trying to retain intellectual property.

“Over the last 10 to 20 years, we have started to see modeling and simulation used in product manufacturing. Today, there’s a strong interest in bringing some of that manufacturing back to the United States,” he says.

He says Americans learned that when they sent manufacturing out of the country, they inadvertently sent something else along with it—the ability to learn from your mistakes and to innovate.

“One problem with shipping your manufacturing overseas is that other people can reverse-engineer your product and learn how to build it better. Another is that new ideas come from the manufacturing process that takes place on the factory floor,” he says, adding that each manufacturing job requires from four to six support jobs.

“America’s recognition of these two facts alone makes this a perfect time to be involved in advanced manufacturing technology,” Marler says.

In addition to receiving support from the National Institutes of Health for the artificial pancreas research, AMTech partners include the Electric Power Research Institute (EPRI). Learn more about AMTech at http://www.ccad.uiowa.edu/amtech/.

Who knew? Iowa excels in manufacturing!

Nearly everyone knows that Iowa is among the top producers of corn and soybeans year in and year out. But far fewer people likely are aware of the fact that Iowa ranks among the top five states when it comes to manufacturing.

According to the U.S. Bureau of Labor Statistics (BLS), 13.6 percent of Iowa’s total nonfarm workforce is employed in manufacturing. That’s good enough for fourth place, trailing only Indiana, Wisconsin and Arkansas. That’s also substantially better than the national average. The BLS reports that manufacturers employ nearly nine percent of all U.S. nonfarm workers and that “manufacturing has played an outsized role in recent economic recovery.”

The National Association of Manufacturers also presents data showing that Iowa has done quite well in manufacturing in recent years. It points out that manufacturing accounts for 17 percent of Iowa’s total output and has been on the rise for several years, surpassing $23 billion in 2009.

In addition, the Association reports that manufacturing’s share of Iowa’s exports was 88 percent in 2010 and that total employment related to manufacturing those exports was some 138,300 workers in 2008. When you factor in Iowa’s leadership role in farm production, you begin to get a picture of an economically well-balanced state.

For Iowans the message is clear. The next time a friend or relative mentions the importance of corn and soybeans to the Iowa economy, don’t forget to add the word “manufacturing.”
But along the way, he also has circled back to places and ideas in his past that could help catapult him toward the future.

Whitmore got a good start in life: He was born in Iowa City at University of Iowa Hospital, where his father was a resident in orthopedic surgery. The family moved to Davenport, Iowa, where young Bob excelled in math and science at Davenport Central High and enjoyed tinkering on his uncle’s farm. Although he considered studying architecture, he decided to study engineering and returned to Iowa City as a freshman at The University of Iowa.

“Like most engineering students, I found the curriculum extremely challenging,” says Whitmore, who earned a BS in Mechanical Engineering in 1986. “In a way it was a test of attrition: ‘Can you survive this?’”

Survive he did, with academic achievement recognized by induction into Tau Beta Pi national engineering honor society and Pi Tau Sigma national mechanical engineering honor society. He also gained entry into graduate school at the University of
Above: Bob Whitmore addresses dignitaries assembled for the opening of the new Seagate Technology Design Center in March in Singapore.

Right: Bob and Molly, his wife, actively support the Ponseti International Organization, a nonprofit established to further the work of the late Dr. Ignacio Ponseti, a world-renowned University of Iowa orthopedist who developed a “low-tech,” nonsurgical method to treat children with congenital clubfoot. They also enjoy stewardship of extensive woodlands that they own. The couple works with state foresters to manage the timber, planting and thinning for sustainable growth.
In Whitmore's worldview, even if you don’t know what a disk drive is, as an engineer, you can figure it out and then figure out a better one.

Minnesota, where he earned a Master’s degree in mechanical engineering in 1988. While wandering around the job fair during his first year of graduate school, he picked up a brochure from a company called Magnetic Peripherals (MPI), a division of Control Data Corporation.

“It said something about rotating through several different engineering specialties,” Whitmore says, “and that kind of appealed to me. On the other hand, the company made disk drives, and I didn’t know anything about disk drives.”

But the rigorous engineering curriculum at Iowa served him well when he finally entered the work world, beginning with Control Data.

“At Iowa, I learned to solve a problem, communicate an idea, and participate on a team— all things that a good engineer needs to be able to do,” he says.

In Whitmore’s worldview, even if you don’t know what a disk drive is, as an engineer, you can figure it out and then figure out a better one.

At Control Data, rotation through different divisions offered the young engineer an opportunity to learn more than just the traditional engineering craft. Rotations through manufacturing, product engineering and research gave him a broad view of the company, allowed him to quickly create a company wide network and understand the applications of computer technology which disdain traditional disciplinary barriers. Later in his career, Whitmore and his family—wife Molly (RN, BSN 1986) and two children—were given the opportunity to live in fascinating places, including Singapore.

That cross-disciplinary, global experience reverberated years later, when Whitmore had risen to be one of the top executives at Seagate Technology—the multi-billion-dollar company that bought Control Data (MPI) in 1989.

“It occurred to me a couple of years ago that we no longer offered that program to let young engineers experience many different facets of the Seagate business,” he says. “So I reinstated it.”

Today the Strategic Engineering Program—STEP—offers Seagate’s top engineering recruits the opportunity to learn about components, product engineering, and manufacturing by working in six-month rotations in the company’s Asia, Northern Ireland, and US operations. The program is highly selective, each year accepting only a dozen of some 200 new engineers.

That global experience mimics Whitmore’s own. Although Seagate’s Minneapolis operation is his home base, he continues to travel frequently to the company’s international manufacturing plants and design centers to ensure his teams are working effectively and efficiently. In 2006 the UI alumnus returned to his alma mater to talk to engineering students about the importance and impact of globalization.

As Executive Vice President and Chief Technology Officer, Whitmore is responsible for overseeing the design and creation of all the technology that goes into Seagate’s disk drives—$800 million of the company’s one billion dollar hard drive research and development budget. (The company’s annual revenue is currently $12 billion). His attention and energy is focused both tactically on near-term productivity and strategically on staging for market demands five and ten years in the future.

Whitmore says the company has a single guiding principle: “People will create and consume data.” He adds that data storage needs have been increasing at the breathtaking rate of fifty-percent increase compounded annually—a figure that undoubtedly assures many people in the industry of their job security.

And will there come a time when hard drives are obsolete?

“Hard drives will be around for a long time,” Whitmore says. “There’s just not enough capacity in other technologies—such as flash—or at a low enough cost to accommodate the replication, movement, and cloud storage of all the data that’s out there.”

The Iowa native also looks to the future in his stewardship of extensive woodlands that he and his wife own in Wisconsin. The couple works with state foresters to manage the timber, planting and thinning for sustainable growth.

“If I hadn’t become an engineer, I would have been a farmer,” Whitmore, a member of the college’s advisory board, says. “I guess I’m kind of circling back to those days when I enjoyed tinkering on my uncle’s farm.”

He and Molly also actively support the Ponseti International Organization, a nonprofit established to further the work of the late Dr. Ignacio Ponseti, a world-renowned University of Iowa orthopedist who developed a “low-tech,” nonsurgical method to treat children with congenital clubfoot. Ponseti trained Whitmore’s physician father, so the son decided to close the loop by giving back to help sustain the master’s work.

“Medicine is a lot like the hard drive industry,” Whitmore says. “The latest and greatest technology often is for the better, but sometimes it’s the straightforward solution that wins the day.

“We’ve done pretty well at Seagate,” he adds. “Since I started in this business, more than 200 hard drive companies have come and gone. Three are left. Kind of like getting through the U of I, it’s a matter of survival, but we’ve done more than survived: We’ve thrived.”

Something that could well be said about Whitmore himself.
Engineering Faculty Members, Alumnus Featured on “World Canvass”

Three Engineering faculty members and an Engineering alumnus recently were guests on a University of Iowa International Programs show, titled “World Canvass.”

“WorldCanvass” explores international topics through lively conversation between scholars and community experts. The program is produced in the Senate Chamber of the Old Capitol Museum and is distributed widely through television, radio and iTunes.

Tom Casavant, Roy J. Carver, Jr. Chair in Bioinformatics and Computational Biology, professor of electrical and computer engineering, biomedical engineering, and ophthalmology and visual sciences, and director of the Center for Bioinformatics and Computational Biology, and P. Barry Butler, UI provost and executive vice president and professor of mechanical and industrial engineering, explored the many ways in which genetics and new technologies are changing the world we live in and challenging long-held assumptions. To listen to the program in its entirety, go to http://www.prx.org/pieces/93118-worldcanvass-genetics-and-new-technologies.

A second “WorldCanvass” program featured “What Is Globalization and How Does It Affect the World Economy.” The show examined what implications globalization has for the U.S., Iowa, and for individuals. A portion of the program showcased an interview with Engineering dean Alec Scranton and Black & Veatch Energy president and CEO Dean Oskvig, who also is a member of the college’s Distinguished Engineering Alumni Academy. Much of the interview was devoted to showcasing the many ways in which the UI prepares students for 21st century careers. To listen to the program in its entirety, go to http://international.uiowa.edu/accents/post/december-7-worldcanvass-investigate-globalization-and-world-economy.

Living with Floods

June 2013 marks the five-year anniversary of the historic floods of 2008 and two-year anniversary of western Iowa flooding in 2011. Living with Floods is a statewide project to commemorate the anniversary of recent flood events statewide in Iowa over the past five years, celebrate progress made towards recovery, and raise awareness of flood mitigation strategies and the interconnectedness of our environment and the watersheds in which we live.

The University of Iowa will engage with seven partner communities—Cedar Rapids, Council Bluffs, Davenport, Des Moines, Dubuque, Iowa City, and Muscatine—to remember the flood and generate community discussions about managing future floods in our watersheds.

The project will culminate on June 7 with free public performances by the Preservation Hall Jazz Band in each community. The performance will be the centerpiece of all events to celebrate progress and raise awareness.

Throughout the spring of 2013, a wide variety of educational events for youth and adults that may include curriculum in the schools, community discussions, and STEM events will be held in each community.

For a list of upcoming Living with Floods events, go to www.iihr.uiowa.edu/livingwithfloods/events/.

Publications
Ozbolat, Ibrahim Tarik and Chen, Howard, an article: “Manufacturing Living Things,” Industrial Engineer, January 2013:30-34.

Grants and Contracts
Two Center for Computer-Aided Design researchers, Tim Marler and Ibrahim Ozbolat, have been awarded funding through the 2012 ICE Commercialization GAP Fund Program. Marler is assistant director and senior research scientist in the virtual soldier research program and adjunct professor with the Departments of Biomedical and Mechanical Engineering. Ozbolat is assistant professor of mechanical and industrial engineering and directs the Design for Manufacturing laboratory and Biomanufacturing laboratory. They received $74,336 for their project entitled “Commercialization of Electromechanical Modeling and Simulation System.” The ICE Commercialization GAP Fund Program is run by the Iowa Centers for Enterprise (ICE) and the University of Iowa Office of the Vice President for Research. The funds are to support the development of innovations with commercial potential, with the result that more UI technology reaches the marketplace.

Tim Brown, senior researcher at the National Advanced Driving Simulator, was awarded a $214,498 research grant from the U.S. Department of Defense, Congressionally Directed Medical Research Program. Brown will use the grant to evaluate and enhance driving ability among teens with Autism Spectrum Disorder (ASD).

Mona Garvin, assistant professor of electrical and computer engineering, received a subcontract in the amount
of $134,557 from St. Luke's Institute for Health Sciences for “NORDIC IIHTT papilledema Evaluation by New Methods of Analyzing OCT.

Troy Lyons, director of engineering services at IIHR--Hydroscience & Engineering, received a $250,000 grant from the City of Akron, OH. Lyons will conduct physical modeling of baffle drop structures for the city.

Adam Ward, assistant professor of geoscience in the College of Liberal Arts & Sciences and associate research engineer at IIHR—Hydroscience & Engineering, received a $56,655 subcontract for “Using a drought-enhanced nitrate pulse to understand stream N retention and processing.”

Industrial Engineering student Allison Kindig and Mechanical Engineering student Sharmar Tejasvi spent winter break in Cameroon making solar cookers for rural villages. Tejasvi is originally from Cameroon. Kindig worked on solar cookers last year in India. The two built four prototype cookers with help from local craftsmen.

Virtual Soldier Research Award

The Awesome Graduate Award: Rich Degenhardt
The Persistence and Drive for Perfection Award: Mahdiar Harari
The VSR Most Valued Staff Award: Rajan Bhatt
The VSR Creativity Award: Kim Farrell
The VSR Founder's Award for Excellence: Steve Beck

Appointments

Hiroyuki Sugiyama has joined the College of Engineering as associate professor of mechanical and industrial engineering. Coming from the Department of Mechanical Engineering at Tokyo University of Science, Sugiyama brings expertise in computational dynamics of multibody systems, vehicle dynamics, wheel/rail contact, tire/road interaction, mechanical vibration, and finite element method. His current research interests lie in flexible multibody dynamics, railroad vehicle dynamics, dynamics of tire, vehicle/turn-out interaction, wind energy drivetrain modeling and simulation. Sugiyama earned a Ph.D. degree in mechanical engineering in 2005 from the University of Illinois at Chicago; and a B.S. degree in 1997 and M.S. degree in 1999, both from Aoyama Gakuin University, Tokyo, Japan.

Pavlo Krokhmal, associate professor of mechanical and industrial engineering, has been appointed editor-in-chief of Optimization Letters, a publication by Springer Science+Media. Optimization Letters covers all aspects of optimization, including theory, algorithms, computational studies, and applications. Krokhmal also is UI associate professor of applied mathematical and computational sciences and a researcher at the UI Center for Computer-Aided Design.

Karim Abdel-Malek, professor of biomedical engineering and director of the UI Center for Computer-Aided Design and Virtual Soldier Research program, was appointed to the Board of Trustees of the American University of Madaba (AUM) in Jordan (http://aum.edu.jo/en/).

Recognition

Research work on non-legacy PCB’s, conducted by Keri Hornbuckle and Dingfei Hu, has been featured in Environmental Health Perspectives, a monthly journal of peer-reviewed research and news published with support from the National Institute of Environmental Health Sciences, National Institutes of Health, U.S. Department of Health and Human Services. Hornbuckle is professor of civil and environmental engineering, faculty research engineer at IIHR—Hydroscience & Engineering, and associate dean for academic programs for the College of Engineering. Hu is assistant research scientist in civil and environmental engineering. The complete text of the article is available at http://ehp.niehs.nih.gov/2010/03/121-a86/

Ching-Long Lin, professor of mechanical and industrial engineering and research engineer, IIHR—Hydroscience & Engineering, was elected and inducted into the American Institute for Medical and Biological Engineering (AIMBE) College of Fellows. Lin was cited for his important contributions in the fields of multiscale high-fidelity imaging-based modeling and high-performance parallel computation and simulation of biological systems.

The University of Iowa Center for Computer-Aided Design presented a series of awards at its February 22 banquet.

Center for Computer-Aided Design (CCAD) Recipients:
The CCAD Global Excellence Award: Anith Mathai
The CCAD Leadership Award: Ibrahim Ozbolat
BioMost Award Recipients:
Research Creativity Award: Chao Zheng
Ingenuity and Perseverance in Design Award: Benjamin Dickerhoff
Younglings with Intellectual Tingling Award: Tatiana Correa and Kevin Johnson

National Advanced Driving Simulator Award Recipients:
The Power Rangers Award: Jeff Gordon, Corey Kruetz, Dave Muller, and Andy Veit
The Cutting the red tape award: Jennifer Henderson, Rose Potter, Kayla Smith, Gary Gaffney, and Tim Brown

Operator Performance Laboratory Award Recipients:
Excellence in Research Award: Dr. Joseph Engler, Michael Yocis, and John Neuhaus
Distinguished Service Award: Mathew Cover
Outstanding Achievement in the Field of Excellence: Carl Richey

Alumni Receptions

Alumni Receptions

The College of Engineering held an alumni reception at Stanley Consultants, Muscatine, Iowa on Monday February 4. Co-hosts of the event were Christopher (BSE 1991) and Heather (Cross) (BSE 2003, MS 2010) Day. Alumni attending included Jay Brady (BSE 1989, MS 1990); Gregs Thomopulos (DSC 2010); Dick Stanley (BSE 1955, BSME 1955, MS 1963); Vern McAllister (BSEE 1970, MS 1971); Rick Smith (BBA 1971); Kent Turner (BSE 1984); John Sovers (BSE 1990); Mark Werner (BSE 1992, MS 1993); Greg Shuger (BSE 2003); Joe Whitney (BSE 2003); Deb Mathias (BSE 1999); and Angela Romero (MS 2009).

Dean Scranton held an informal reception at the Renaissance Philadelphia Airport Hotel on March 14. Attendees included Leon Nolting (BSChE 1960) and John L. Kessler (BSChE 1981).
From the Foundation

Spring has sprung! And there are fun things in store at the UI College of Engineering as we get closer to graduation. Mark your calendars for Saturday, May 4th as we host our first “Inside Engineering” at the college in celebration of our university wide comprehensive campaign kick-off.

For nearly eight years now, I have been traveling the country and parts of the world visiting alumni and donors to the College of Engineering. I am always impressed by the loyalty and passion our alumni have for this great University. They share their remarkable stories of where they came from, the special faculty members who provided guidance and encouragement, the hard work they put into their current research and careers, and the successful lives they now lead.

As an alumnus to the University of Iowa myself, I am amazed at all of the opportunities students have in the College of Engineering. A solid engineering education isn’t just given to today’s students, they have to accept the challenge and apply themselves. If they do so, they have the opportunity to transform their lives, to have an impact on society and to become “engineers…and something more.”

One of the best ways that alumni can have an impact on today’s students is by supporting our annual giving programs. These unrestricted gifts help the college and its individual departments and programs create remarkable educational opportunities that are not covered by state allocations or tuition revenue. Gifts are used to purchase research materials, provide student financial aid, support faculty, develop innovative programming, and bring international experts to campus to share their knowledge with current students. Please consider making your gift online today: www.givetoiowa.org/engineering

It is an honor for me to be a development officer for the College of Engineering. I know that the work I am doing serves as a connection between alumni and today’s students, and that together, we are helping shape tomorrow’s engineering leaders. Please feel free to contact me to share your own story of how your Iowa engineering education played a role in your success and learn how your support can change students’ lives.

Kate Metcalf
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1970’s
Randy Beavers (BSCE 1972, MS 1973) was appointed system general manager at Warren Water District, Indiana, IA. Beavers also is the retired general manager and CEO of the Des Moines, IA, Water Works.

Ali Fatemi (BSE 1979, MS 1980, PhD 1985), professor of mechanical, industrial, and manufacturing engineering and director of the fatigue and fracture research laboratory, University of Toledo, has been honored with a university Distinguished Professorship.

1980’s
Gregory J. Kirsch (BSE 1987), partner and head of the Intellectual Property Practice of Smith, Gambrell & Russell, LLP, was named to the Georgia Super Lawyers and Rising Stars for 2013.

1990’s
Stephanie Acri (BSE 1990) mechanical engineering is president of Evans Premium Manufacturing, Rock Island, IL.

2000’s
Avery Bang (BSE 2007) was among the Top 25 Newsmakers by Engineering News-Record. ENR Newsmakers are chosen for their innovations and achievements, for giving back to the industry and the public and for going beyond their day-to-day jobs. Her complete newsmaking story is available at http://enr.construction.com/people/awards/2013/0128-young-bridge-engineer-is-changing-lives.asp.

Josh Gersten (BSE 2004) is manager, warehouse operations at Integrated DNA Technologies, Coralville, IA. Gersten also is a member of the College of Engineering’s Young Alumni Advisory Board.

2010’s
Anthony Melchiorri (BSE 2011) has been appointed Writing Fellow at University of Maryland. He will provide consultations with graduate students regarding research papers, abstracts, conference proceedings, dissertation work, presentations, proposals and other written work.
Margaret Petersen, 1920–2013

IIHR-Hydroscience & Engineering alumnus Margaret Petersen died on January 18, 2013, in Tucson, Arizona, at the age of 92. Professor Petersen was renowned as a very capable hydraulic engineer in the mid-1900s, when it was uncommon for women to be involved in engineering. She remained professionally involved in her field and in the American Society of Civil Engineers (ASCE) throughout her 55-year career. That career began in 1942 when she joined the US Army Corps of Engineers (COE) in Rock Island. She then returned to the University of Iowa (UI), receiving a bachelor’s degree in civil engineering in 1947 and a master’s degree in Mechanics and Hydraulics in 1953. She remained with the COE for nearly four decades, during which time she dealt with design of hydraulic structures, channel hydraulics, water resource planning, and related subjects. She held increasingly responsible posts and worked on some of the nation’s largest water projects, including Mississippi River flood control and navigation efforts, Missouri River storage reservoirs, and the Arkansas River navigation project.

In 1980, Ms. Petersen became an engineering professor at the University of Arizona. Here she developed new graduate coursework in hydraulic engineering, wrote the well-known textbook River Engineering (1986), and became an invited lecturer and consultant in several foreign countries. She became an emeritus professor in 1991, but did not fully retire from teaching until 1997. She was known as an influential mentor and supportive sounding board who was tremendously loyal to her students and also brought a practical, applied side to water engineering. She endowed two scholarships at the University of Iowa for female engineering undergraduates.

Professor Petersen was an Honorary Member of the ASCE (1991). She received the ASCE’s Hunter Rouse Hydraulic Engineering Award (2001) and its Environmental and Water Resources Institute’s first Lifetime Achievement Award (2002). The latter institute also established the Margaret Petersen Outstanding Woman of the Year Award in Petersen’s honor. Professor Petersen received the UI’s Distinguished Alumni Achievement Award in 1987, and she was inducted into the Distinguished Engineering Alumni Academy in 1996.

1940’s
Bert C. Blakesley (BSEE 1942) of Prescott, WI, October 31, 2012.
Elmer F. Grissel, Jr. (BSME 1942) of Cedar Rapids, IA, December 6, 2012.
Horace S. Knight (BSChE 1941) of Houston, TX, January 16, 2013.
James R. Lang (BSME 1948, MS 1951) of Banning, CA, January 5, 2011.
Margaret S. Petersen (BSCE 1947, MS 1953) of Tucson, AZ, January 18, 2013.
James M. Robertson (MS 1940, PhD 1941) of North Chili, NY, November 22, 2012.

1950’s
Vern E. Halverson (BSCE 1952) of Springfield, IL, January 16, 2013.
Peter Kocsis, Jr., (MS 1952) of Barrington, IL, November 27, 2012.
John S. Miller (BSME 1952) of Ramona, CA, September 14, 2012.
Phillip J. Oeth (BSME 1953) of Los Gatos, CA, June 29, 2009.
Howard T. Thistlewood (BSME 1951) of Peoria, IL, October 21, 2008.

1960’s

1970’s
Miles H. Bailey (BSEE 1972) of West Branch, IA, February 5, 2013.
Anand S. Chepuri (MS 1979) of West Bloomfield, MI, October 9, 2012.

1980’s
Taleb Salameh (BSEE 2009) of North Liberty, IA March 10, 2013.

2010’s
Dustin Tardiff (BSE 2010) of Charlotte, NC, March 5, 2013.
Taleb Salameh (BSEE 2009) of North Liberty, IA March 10, 2013.
The College of Engineering has introduced a new undergraduate student certificate in wind energy to meet emerging market needs.

The certificate integrates coursework and faculty expertise from the Departments of Mechanical and Industrial Engineering, Civil and Environmental Engineering, Electrical and Computer Engineering, and Geography in the College of Liberal Arts and Sciences.

The wind energy certificate requires 18 hours of coursework in energy, environment, and information science. Required courses for the certificate include Wind Power Management and Spatial Analyses of Wind Energy. Students can choose from 19 different courses to fulfill the remaining 12 hours needed for the certificate.

Wind Turbine Aerodynamics from Mechanical and Industrial Engineering and Spatial Analyses of Wind Energy from the Geography Department are new courses offered this spring for the certificate. Also, an additional course, titled Information Systems for Resource Management, was developed and will be offered in fall 2013.

The certificate is open to all students meeting eligible to take courses required for the certificate.