

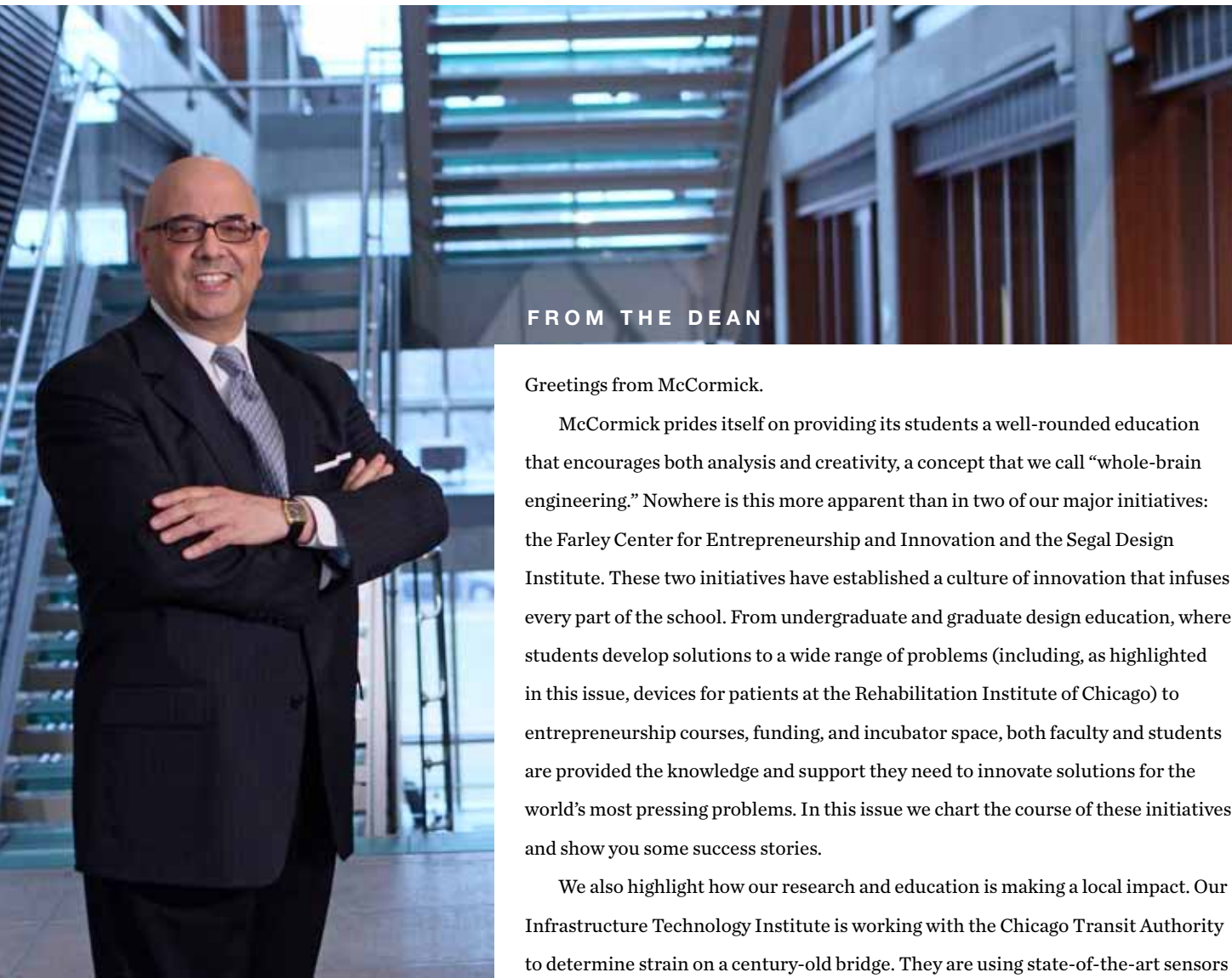
McCormick

magazine | spring 2011



ARCHITECTURE IN BERLIN
STUDENTS LEARN FROM THE MASTERS

Robert R. McCormick School of
Engineering and Applied Science
Northwestern University



FROM THE DEAN

Greetings from McCormick.

McCormick prides itself on providing its students a well-rounded education that encourages both analysis and creativity, a concept that we call “whole-brain engineering.” Nowhere is this more apparent than in two of our major initiatives: the Farley Center for Entrepreneurship and Innovation and the Segal Design Institute. These two initiatives have established a culture of innovation that infuses every part of the school. From undergraduate and graduate design education, where students develop solutions to a wide range of problems (including, as highlighted in this issue, devices for patients at the Rehabilitation Institute of Chicago) to entrepreneurship courses, funding, and incubator space, both faculty and students are provided the knowledge and support they need to innovate solutions for the world’s most pressing problems. In this issue we chart the course of these initiatives and show you some success stories.

We also highlight how our research and education is making a local impact. Our Infrastructure Technology Institute is working with the Chicago Transit Authority to determine strain on a century-old bridge. They are using state-of-the-art sensors that provide insight into the structural health of the bridge.

On our cover you can see a photo from our Architectural Engineering and Design Program’s recent study abroad trip to Berlin. Students spent a week there in the offices of world-renowned architect Helmut Jahn, gaining a unique perspective on architecture and engineering while receiving feedback from Jahn and other well-known stakeholders in the architecture world. The program, now three years old, is another example of McCormick’s commitment to design and innovation: students in the program are using their background in engineering and their additional studies in the structure and creativity behind buildings to forge their own paths in the building business.

As always, I welcome your feedback.

Julio M. Ottino, Dean | April 2011

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On the cover: A student in McCormick’s Architectural Engineering and Design Program works on sketches in the Berlin office of architect Helmut Jahn. See story on page 22.

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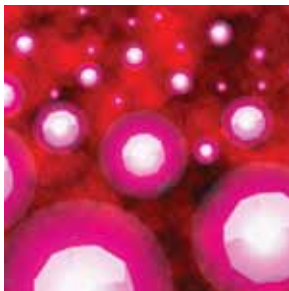
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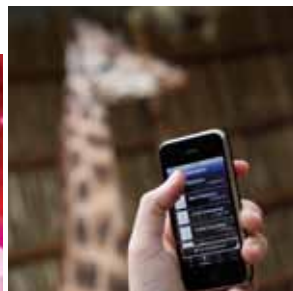
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McCormick news

WWW.MCCORMICK.NORTHWESTERN.EDU

INNOVATIVE NEWS LAB LAUNCHED



A one-of-a-kind lab aimed at reinventing journalism for the digital age has been created at Northwestern. The Knight News Innovation Laboratory will bring together journalists and computer scientists to accelerate local media innovation by creating new digital tools, building partnerships with media organizations, and expanding the media innovation community. The McCormick School is collaborating on the venture with the Medill School of Journalism and the John S. and James L. Knight Foundation.

The lab—the first of its kind in the country—is funded by a four-year, \$4.2 million grant from the Knight Foundation. Its mission is to improve the news and information people use to run their communities and their lives. It will partner with Chicago-area media organizations to test, deploy, and refine technologies that help them create and package content, engage audiences, and improve their capacity to produce local news and information.

The Knight Lab's work will be carried out under the auspices of the Medill-McCormick Center for Innovation in Technology, Media, and Journalism, created in 2009. **Kris Hammond** (above, far left), professor of electrical engineering and computer science, and **Larry Birnbaum** (above, center), associate professor of electrical engineering and computer science, provide the McCormick leadership for the center, along with Owen Youngman and Rich Gordon from Medill.

Julio M. Ottino, dean of the McCormick School, says, "Northwestern is a university that embraces interdisciplinary work, and the McCormick School is a place where computer scientists and experts in areas such as journalism can collaborate to shape the future."

McCORMICK RISES IN RANKINGS

The McCormick School has improved its position in the rankings produced by *US News & World Report* magazine. McCormick was recognized as having the 13th best undergraduate engineering program in the country, and its graduate program ranking climbed to 20th. Rankings of graduate programs were particularly strong, with six departments ranked in the top 20 nationally. McCormick also fared well in the recent rankings by the National Research Council. Read more at www.mccormick.northwestern.edu/news.



STRETCHABLE ELECTRONICS SIMPLIFY CARDIAC THERAPY



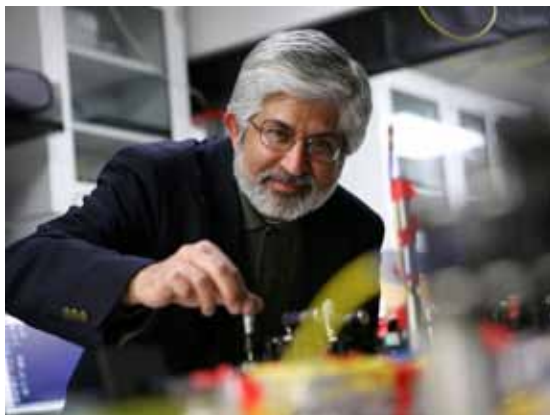
As an alternative to open-heart surgery, cardiologists now use catheters to eliminate damaged heart tissue in certain patients, such as those with arrhythmias.

This procedure can also be protracted and painful, as many catheters with many different functions must be inserted into the patient.

Now an interdisciplinary team including researchers from the McCormick School has developed a single multifunctional catheter that makes a minimally invasive technique for heart surgery even better. This tool for cardiac ablation therapy has both diagnostic and treatment capabilities and combines all necessary medical devices into a standard balloon catheter: a device for eliminating damaged tissue using heat, temperature and pressure sensors, and an electrocardiogram sensor.

The stretchable electronics that make it possible were developed by **Yonggang Huang**, Joseph Cummings Professor of Civil and Environmental Engineering and Mechanical Engineering, and John Rogers of the University of Illinois at Urbana-Champaign. "The use of one catheter to achieve all these functions will significantly improve clinical arrhythmia therapy by reducing the number of steps in the procedure, thereby saving time and reducing costs," says Huang. Read more at www.mccormick.northwestern.edu/news.

NEW SWITCHING DEVICE COULD HELP BUILD ULTRAFAST QUANTUM INTERNET



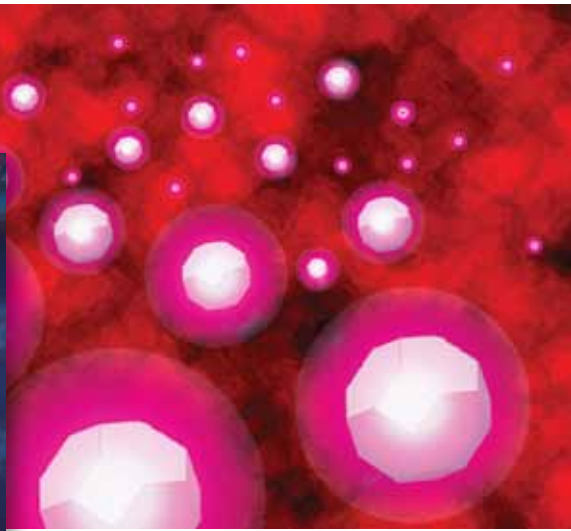
Northwestern researchers have developed a new switching device that takes quantum communication to a new level. The device is a practical step toward creating a network that takes advantage of the mysterious and powerful world of quantum mechanics.

A demonstration of the first all-optical switch suitable for single-photon quantum communications was published by the journal *Physical Review Letters*. The switch could be used in achieving two goals of the information technology world: a quantum Internet, where encrypted information would be completely secure, and networking superfast quantum computers.

Prem Kumar, AT&T Professor of Information Technology and senior author of the paper, says, "My goal is to make quantum communication devices very practical. We work in fiber optics so that as quantum communication matures it can easily be integrated into the existing telecommunication infrastructure."

The switch would enable a common transport mechanism, such as the ubiquitous fiber-optic infrastructure, to be shared among many users of quantum information. Such a system could route a quantum bit, such as a photon, to its final destination just as an e-mail is routed across the Internet today.

TINY GEMS TAKE BIG STEP IN CANCER BATTLE



Resistance to chemotherapy drugs contributes to treatment failure in more than 90 percent of metastatic cancer cases.

Overcoming this hurdle would significantly improve cancer survival rates. **Dean Ho**, associate professor of biomedical engineering and mechanical engineering, believes a tiny carbon particle called a nanodiamond (above) may offer an effective drug-delivery solution for hard-to-treat cancers.

In vivo studies of liver and breast cancer models conducted by Ho and a multidisciplinary team of scientists, engineers, and clinicians found that a normally lethal amount of a chemotherapy drug when bound to nanodiamonds significantly reduced the size of tumors in mice with no toxic effects on tissues and organs. Survival rates also increased.

This is the first work to demonstrate the significance and translational potential of nanodiamonds in the treatment of chemotherapy-resistant cancers. The results were published in the journal *Science Translational Medicine*. Read more at www.mccormick.northwestern.edu/news.

TRANSPORTATION SECRETARY HONORED AT SYMPOSIUM

Former US Secretary of Transportation and White House chief of staff Samuel K. Skinner received the David F. Schulz Award for Outstanding Public Service in Transportation and Infrastructure Policy from Northwestern last November. The honor was presented at the fourth annual William O. Lipinski Symposium on Transportation Policy.

The symposium, titled "Public Transit for Chicago: A Sustainable Ride to the Future," brought together transportation leaders and policy makers from across the country to address the mass transit challenges and opportunities facing the region and nation. Northwestern's Infrastructure Technology Institute sponsored the event, named for former Congressman William O. Lipinski of Chicago. Lipinski hosted the conference and presented Skinner with the Schulz Award, named for the late Dave Schulz, founding director of the institute.

In addition to Lipinski, participants at the symposium included University President Morton Schapiro; Rep. Peter DeFazio (D-OR), Rep. Daniel Lipinski (D-IL); Richard L. Rodriguez, president of the Chicago Transit Authority; Michael J. Madigan, speaker of the Illinois House of Representatives; and John Cullerton, president of the Illinois Senate.



Joseph Schofer, Jo Ann Schulz, Samuel Skinner, and William Lipinski



Entrepreneurship + Design

Two areas—and the intersections between them—are defining McCormick as an innovator in engineering education



The Farley Center for Entrepreneurship and Innovation


Building a culture of entrepreneurship

NEXT TO THE RED LINE “L” TRACKS in Chicago’s Lakeview neighborhood you’ll find the makeshift one-room office of Datascope Analytics. Its contents are sparse: a conference table, a television, two computers, a few small appliances. The décor is minimal—white boards full of equations and ideas—except for one splash of color: the entrance wall is painted a color dubbed “Datascope Analytics orange” by the start-up’s founders. Outside, a train rumbles by.

At the whiteboards or the computers on any given weekday are Datascope’s cofounders, Dean Malmgren and Mike Stringer, the self-effacing Northwestern PhD graduates who founded the company because, as the name might suggest, they love analyzing large data sets. “It sounds kind of nerdy,” Stringer admits.

ENERGIZING RESEARCH

Are new materials the key to sustainability?



IN THE SEARCH FOR NEW SUSTAINABLE ENERGY TECHNOLOGIES, ANSWERS OFTEN LIE NOT IN DEVICES BUT IN THE MATERIALS THAT MAKE THEM WORK. IN EVERYTHING FROM PHOTOVOLTAIC CELLS TO FUEL CELLS AND ELECTRODES IN BATTERIES, RESEARCHERS ARE LOOKING AT MATERIALS—HOW THEY ACT UNDER DIFFERENT CIRCUMSTANCES, AND HOW THEY CAN BE DESIGNED—TO FIND NEXT-GENERATION SOLUTIONS TO OUR GROWING ENERGY PROBLEMS.

Mobile menagerie

Students partner with the Lincoln Park Zoo to create a mobile app



There are the lions. The giraffes. The seals. More than 1,200 animals on 35 acres at the Lincoln Park Zoo in Chicago. Where do you start? What shouldn't you miss? When are they eating? Where can you eat?

As the saying goes:
There's an app for that.

Architecture in Berlin

Undergraduates work with Helmut Jahn

At 10 a.m. on that Thursday morning in Berlin, the office was silent. Eight students—all part of McCormick's Architectural Engineering and Design Program—hunched over their desks, hustling to finish the projects they'd been working on all week. Their charge: design an event that would take place in the atrium of the Sony Center, a multibuilding complex in the center of Berlin that has become a symbol of the city's ongoing redevelopment. Their guide: Sony Center architect Helmut Jahn, who has designed dozens of buildings around the globe and whose Berlin office the students had taken over for the week.

Preparing to present their designs to a jury, the students drew and erased and drew again, gluing together tiny models made of fabric, felt, leaves, and cardboard. "I hope they like it," said Francesca Ferrero (civil engineering '11), who designed a pop concert for the venue. "Actually, I hope I like it."

"It's coming along," said Matthew Shaxted (civil engineering '11), who ditched his model in favor of simple drawings. "Well, it's a little difficult. I didn't sleep."

In just a few hours, the students would hang up their sketches and try to sell their ideas to a jury most architecture and engineering students could only dream of: Jahn; Laurence Booth, who, in addition to being director of the renowned Chicago architectural firm Booth Hansen, is the Richard C. Halpern/RISE International Distinguished Architect in Residence at McCormick and director of the Architectural Engineering and Design Program; Steffen Duemler, principal architect in the firm of Murphy/Jahn; Leif Selkregg, CEO of the project management company RISE International; and renowned structural engineer Werner Sobek, who with Jahn designed the Sony Center and coined the term "archineering" to describe the combination of architecture and engineering that ultimately creates better buildings.

Finally, it was time for the students to present. Ryan Shanahan (civil engineering '11) stood next to his drawings. The room was quiet—this time, in anticipation.

Shanahan began: "When we walked into the Sony Center, I immediately felt like I was in a coliseum."

And the jury listened.

A blended approach to architecture

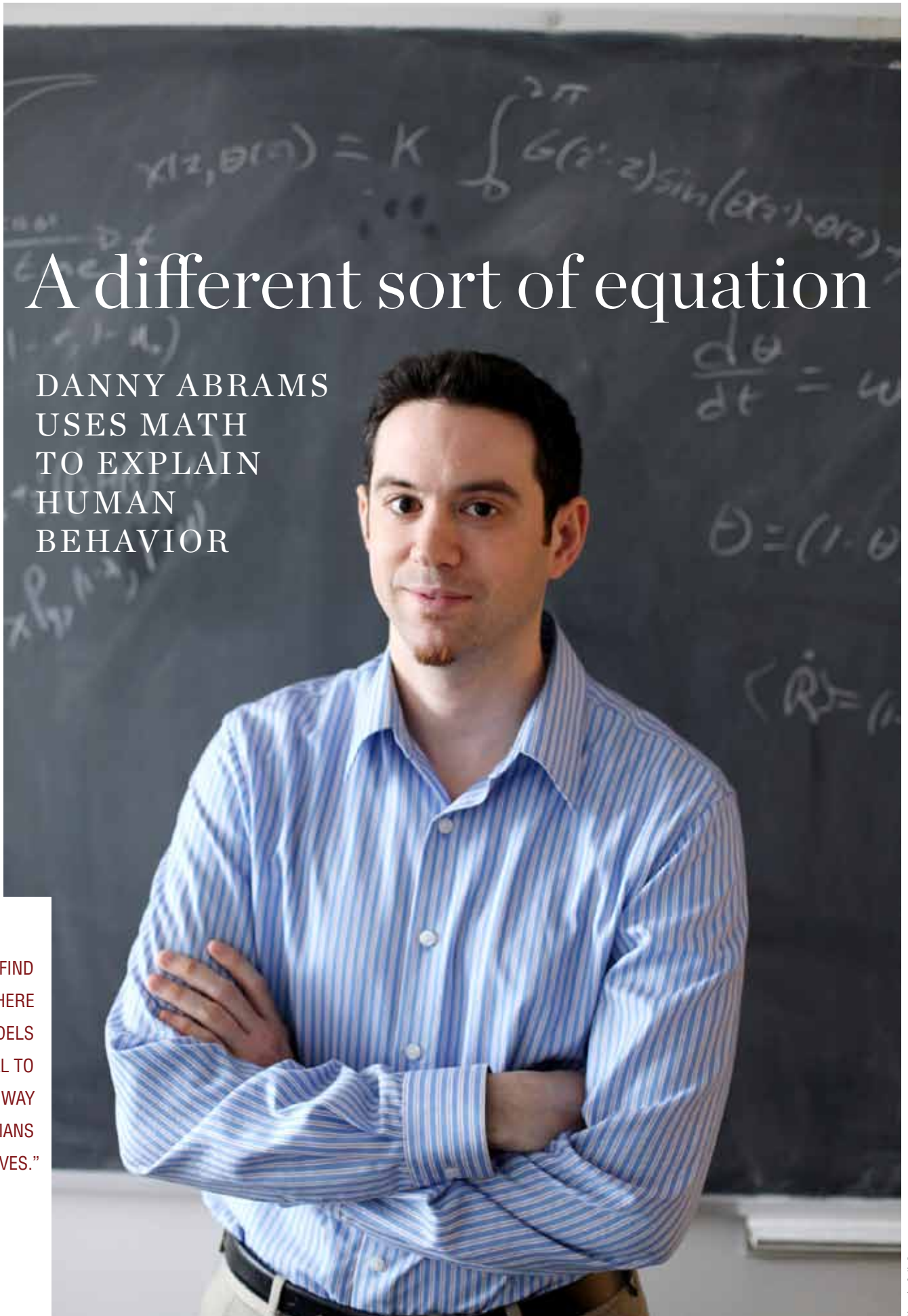
The Architectural Engineering and Design Program began in fall 2008 after Dean Julio M. Ottino saw an opportunity to combine Chicago's architectural strengths with the design initiatives at McCormick. "Given the city's prominence in architecture," he said, "I felt it was important that Northwestern be part of that world."

At the same time Selkregg and Richard Halpern, cofounders of Chicago-based RISE International, began discussing how architecture could be integrated into McCormick's curriculum. RISE often hires McCormick students for co-op programs and jobs after graduation, and Halpern is a member of the McCormick Advisory Council. "The most important buildings have this blended approach to architecture and engineering," Selkregg said. "We thought engineering students would benefit from an architecture education."

The pair made a generous donation to endow the architect-in-residence position now held by Booth. "I find it exciting to use my experience and pass it on to others," said Booth. "I want to make architecture as interesting for them as it has been for me."

The Architectural Engineering and Design Program consists of three studio courses in which students create progressively bigger projects. In 2009–10 students first designed a coffeehouse, then a school, then a skyscraper. They also learned how to use energy-modeling software to make their buildings more sustainable. Ultimately the program offers students a new perspective





A different sort of equation

DANNY ABRAMS
USES MATH
TO EXPLAIN
HUMAN
BEHAVIOR

“I’M TRYING TO FIND
EXAMPLES WHERE
MATHEMATICAL MODELS
HAVE POTENTIAL TO
PINPOINT THE WAY
A SYSTEM OF HUMANS
BEHAVES.”

Danny Abrams readily admits it: “My research is all over the place.” Fireflies. Obesity. Language. Religion. All are connected, in Abrams’s view, as a series of phenomena that can be explained using similar mathematical tools. Now, back from a four-month research stay in Peru under a Fulbright fellowship and armed with a grant from the James S. McDonnell Foundation, Abrams is using his expertise in synchronization and the physics of social systems to create mathematical models of these phenomena that may ultimately give us a new outlook on human behavior.

Abrams’s interest in applied mathematics was cultivated in graduate school at Cornell, where he began working in the area of coupled oscillators, the study of how oscillators behave in groups. An example can be found in groups of fireflies, where the fireflies’ random blinking can suddenly become synchronized. “If you have a surface covered with fireflies,” he says, “you get certain situations where a portion of those fireflies blink randomly while the rest form a spiral-shaped wave of synchronized blinking. It’s a newly discovered type of pattern formation.”

Abrams, assistant professor of engineering sciences and applied mathematics, created a model of this wave, which has implications beyond insect biology. In people with certain kinds of heart defects, for example, the cardiac cells around the heart don’t expand and contract in time with the heartbeat as normal cells do. Instead, the cells contract randomly or in a spiral wave that rotates around the heart. Abrams’s model could help explain how that works.

Synchronization was also a factor in a problem Abrams tackled in graduate school: the opening and subsequent reengineering of the Millennium Bridge in London. When it first opened in 2000, a crowd of revelers began to cross, and the bridge began to sway from side to side. The contractions forced everyone on the bridge to fall into the same side-to-side steps, like penguins, which amplified the shaking.

“Here we had a model of people acting like oscillators,” Abrams says. “This natural cycle of the bridge swaying connected people and made them adapt their footfalls. I’m trying to find other examples where mathematical models can be somewhat predictive or have potential to pinpoint the way a system of humans behaves.”

Perhaps the social system that most interests Abrams is language: he speaks five of them and says language offers a break from his everyday research. “It’s nice not to do math and physics all the time,” he says.

Now he’s combined his hobby with his research to study the phenomenon of language death. Of the more than 6,000 languages in the world today, most will die with the people who now speak them. Why are so many languages death-bound? Many people point to increased travel and contact between cultures and a greater ability to communicate across language lines. Abrams’s approach to the subject is through dual-language cultures, where there is generally a minority language and a majority language and where, as a model that Abrams created shows, only one can survive.

“My model treats languages as though they are competing for speakers,” Abrams says. “It shows there is a tipping point where the system goes to one language. It gives some insight into why this is happening all over the world.”

In Peru, Abrams researched competition between two languages he has firsthand knowledge of: Spanish and Quechua, an Incan language primarily


spoken in the Andes. Abrams studied Spanish in college and graduate school and learned Quechua after being recruited by a professor who stood outside his Spanish class. About 83 percent of Peruvians speak Spanish as their primary language, and about 13 percent primarily speak Quechua. Abrams asked students at the Universidad Nacional de San Antonio Abad del Cusco which language they spoke, which language their parents spoke, and what portion of the people in their hometowns spoke Quechua or Spanish. “I wanted data about how people’s social networks affect their probability of changing languages,” he says.

Though Quechua isn’t in danger of dying anytime soon, it makes a good case for a dual-language model. Studies have shown that two factors drive language change: the majority effect, in which people benefit if they can communicate with more of their peers (and therefore gain an advantage when switching to a majority language), and the status effect, in which society provides greater benefits to those who speak a language that has a higher status. In Peru and much of South America, Spanish is regarded as an urban, higher-class language, while Quechua is mostly spoken in poorer, rural areas. Abrams hopes to conduct a wider survey that will help him expand his model of language competition to include social networks.

Abrams recently received a three-year grant from the James S. McDonnell Foundation, which funds complex systems research. With this money Abrams hopes to study more systems involving groups competing for members. For example, he is working on a model of competition between religious and nonreligious groups using census records from nine different countries. The 2008 American Religious Identification Survey found that Americans who don’t identify with any particular religious group are the fastest growing religious minority. In the Netherlands, those who affiliate with a religion are now in the minority. Using his language competition model as a basis, Abrams has preliminary results that show how religious affiliation can shift.

Abrams’s research has branched out into other areas of human experience, such as obesity. Obesity rates in the United States stand at 30 percent, and recent studies show that the chance of an individual’s becoming obese strongly correlates with obesity rates of his or her social network. Abrams hopes to create a model that shows how biological and social factors affect the way a person’s weight changes over time.

Abrams is also interested in why about 10 percent of the population is left-handed. Abrams believe it’s an indication of the balance between cooperation and competition in human evolution: If societies were entirely cooperative, everyone would be same-handed. But if competition were more important, one could expect the population to be 50-50. Lefties compose up to 50 percent of top boxers and baseball players, where being left-handed is a key competitive advantage. Abrams hopes to create a model that shows how competition and conformity create the 90-10 ratio.

“As computers and simulation become more widespread in science, it remains important to create understandable mathematical models of the phenomena that interest us,” Abrams said. “By discarding unnecessary elements, these simple models can give us insight into the most important aspects of a problem, sometimes even shedding light on things—like human behavior—that are seemingly outside the domain of math.”  Emily Ayshford

Alumni Profile: Gwynne Shotwell

Growing up, Gwynne Shotwell was always good at math and science, and she was always curious about how things worked. But when she began thinking about a career in high school, Shotwell, couldn't see herself using her strengths in engineering. She was terrified of becoming, well, **nerdy.**

So how did she go on to receive both an undergraduate and master's degree from McCormick?

"That was my mom's fault," she says. Shotwell's mother took her to a Society of Women Engineers panel for teenage girls, and there she met a female mechanical engineer who owned her own business. "I loved what she had to say, loved her perspective—and she wasn't all that nerdy," Shotwell says. "I thought, 'It's okay to be a woman and an engineer.'"

The choice has served her well: Shotwell is now president of SpaceX, one of the most innovative companies in the country. A space transport company started by PayPal founder Elon Musk, SpaceX (short for Space Exploration Technologies Corp.) has developed two space launch vehicles—Falcon 1 and Falcon 9—and the Dragon spacecraft, which will deliver cargo to the International Space Station for NASA. In December 2010 SpaceX became the first private company to successfully launch, orbit, and recover a spacecraft.

But back in 1982, Shotwell was a freshman navigating her way through introductory engineering courses. She can remember when the Wildcat football team broke its 49-game losing streak, and she can remember suffering a few setbacks in her engineering classes—specifically, 3-D Rigid Body Dynamics.

"I didn't do great on the midterms," she said. "But when I was studying for the final, it just clicked for me." She got one of the highest grades in the class. "I remember the professor looking at me, surprised, in a way that said, 'Well done.' That was a great memory."

While at Northwestern, Shotwell took advantage of the school's wide-ranging opportunities to create her own version

of what McCormick now calls a whole-brained engineering education. "I really wanted to go to a university that had a broad perspective on education," she says.

"I had great economics professors, I took an art class, I went to all of the theater events. It was a very well-rounded experience that helped me personally."

After receiving an undergraduate degree in mechanical engineering in 1986 and a graduate degree in applied

"I just loved what Dean Ottino had to say about whole-brain engineering. That really struck a chord."

GWYNNE SHOTWELL

mathematics in 1988, Shotwell went on to work in space systems engineering and technology at the Aerospace Corporation, where she quickly moved up the ladder. She was recruited to be director of the space systems division at Microcosm before joining SpaceX in 2002 as vice president of business development. In that role, she developed SpaceX's customer base and managed strategic relations. She was named president in 2008.

Shotwell's career has evolved naturally from engineer to manager because she isn't "that person who wants to sit at my desk and work without talking to anyone. I want to go out and be part of a team, work on projects, communicate," she says. "I always wanted to talk with people and find the gaps between one person and another person. It's bridging those gaps and interfaces where I felt like I could contribute the most."

Shotwell was SpaceX's seventh employee when it was founded in 2002—now the company boasts over

1,250 employees, three launch sites, a rocket-development facility in Texas, and a 550,000-square-foot factory with offices in Hawthorne, California. The company designs, manufactures, and tests the majority of the components of its space vehicles in house. Next, the company hopes to make its Dragon spacecraft ready for human transport, upgrade the engine for its rockets, and launch a new rocket for lifting heavy payloads into space.


"We've got a lot of development sitting in front of us," she says. "We're busy." Yet Shotwell made time this fall to come back to Northwestern and speak to faculty and students at

McCormick's Dean's Seminar Series. She was appointed to the McCormick Advisory Council, and she will come back this June as McCormick's convocation speaker.

"I just loved what Dean Ottino had to say about whole-brain engineering," she says. "That really struck a chord with me. That's why I selected Northwestern."

While visiting McCormick, Shotwell also met with students who were interested in interning at SpaceX, and she hopes to continue that recruiting relationship in the future. "It was just time to start reaching out," she says. "Northwestern is an awesome school. We wanted to make sure we were engaged here."

Shotwell advises undergraduates who are looking to emulate her success to work on real projects. She says it's only through developing a project, testing it, and deploying it that you truly learn the engineering process.

"You need to understand the theory," she says, "but you've got to be able to put that to work."  Emily Ayshford





Clockwise from left: Gwynne Shotwell; the Dragon spacecraft; the Falcon 9 rocket launches the Dragon spacecraft into orbit on December 8, 2010—a flight that made SpaceX the first private company to launch and recover a spacecraft from orbit; the Dragon spacecraft at Cape Canaveral in December 2010. *Photos courtesy of SpaceX.*



Entrepreneurship *by the numbers*

100

PERCENT INCREASE
IN NUMBER OF
APPLICATIONS FOR
NUVENTION: WEB SINCE
IT WAS FIRST OFFERED

2008

YEAR THE FARLEY CENTER
FOR ENTREPRENEURSHIP AND
INNOVATION WAS ENDOWED

14

NORTHWESTERN-
RELATED BUSINESSES
STARTED IN THE
FARLEY CENTER
INCUBATOR

COURSES OFFERED
THROUGH THE
FARLEY CENTER

7

52

PERCENTAGE OF INVENTION DISCLOSURES
AT NORTHWESTERN ORIGINATING IN
McCORMICK (JUNE-DECEMBER 2010)

2020

STUDENT
COMPANIES
CREATED
THROUGH
FARLEY CENTER
SERVICES AND
COURSES

NORTHWESTERN SCHOOLS
WHOSE STUDENTS HAVE TAKEN
NUVENTION COURSES

8

446

STUDENTS WHO HAVE TAKEN
INTERDISCIPLINARY NUVENTION
COURSES SINCE THEIR INCEPTION

250+

PEOPLE WHO ATTEND THE FARLEY
ENTREPRENEURSHIP SUMMIT EACH YEAR

\$1,000,000+

FUNDING RAISED AND REVENUE GENERATED BY FARLEY CENTER
INCUBATOR BUSINESSES

\$3,000,000+

FUNDING RAISED BY COMPANIES OF NUVENTION ALUMS

3

NUVENTION COURSES
CURRENTLY OFFERED
(MEDICAL, ENERGY,
AND WEB)

CLASS NOTES

1940s

Lester Crown ('46) is chairman of Henry Crown & Co., which has entered the suburban office market with the purchase of three office buildings in Oak Brook, Oakbrook Terrace, and Clarendon Hills, Illinois.

1960s

David J. Kuck (MS '60, PhD '63), a researcher in Intel's software and solutions group and an Intel Fellow, was the recipient of the Theodore M. Matson Memorial Award, which recognizes outstanding contributions in the field of traffic engineering.

Jim Brown ('62, MMgmt '67) of Naperville, Illinois, wrote *More than a Game: A Vehicle for Child Development* (Legacy Book Co., 2009). The book uses football as a vehicle for child development and teaches how to create and lead high-performing teams in business, family or sports. Brown has coached youth sports for 41 years.

David A. Carlson ('62, Kellogg '64), a technical adviser to the Fibre Box Association in Elk Grove, Illinois, received the TAPPIE Corrugated Packaging Division Lifetime Achievement Award.

John N. LaPlante (MS '62), director of traffic engineering for TY Lin International, received the Theodore M. Matson Memorial Award, which recognizes outstanding contributions in the field of traffic engineering.

Charles R. Buck Jr. ('64) of Naples, Florida, received the Health Management and Informatics Alumni Organization's first Lifetime Achievement Award at the 2010 American College of Healthcare Executives Annual Congress. He has published journal articles in a variety of publications, including the *New England Journal of Medicine* and *Health Affairs*.

1970s

Kathleen R. Flaherty (Weinberg '73, MS '75, PhD '79), former chief marketing officer of AT&T Corporation, was appointed an independent nonexecutive director of Yell Group.

Josh Jacobs ('77) of Chicago is chair of orthopedic surgery at Rush University Medical Center. He was elected president of the US Bone and Joint Decade, a national action network of a global campaign to improve the quality of life for people with musculoskeletal conditions.

Michael E. Friduss ('79) of Palo Alto, California, is a clinical associate professor in the head and neck surgery department at Stanford University. He received the department's clinical faculty teaching award for 2009.

1980s

Mike Kelly ('80) was named a senior member of the Association for Computing Machinery, the world's foremost educational and scientific computing organization. He runs Mike Kelly Consulting on Bainbridge Island, Washington.

Brad Smith ('81) of Sammamish, Washington, is the director of worldwide licensing and pricing at Microsoft, where he has worked for seven years.

George Ribarchik ('82), senior food scientist for Wacky Snacky Inc., received a "best green paper" award from the American Sustainability Society for his paper "Bioflavinoid Synthesis via Protein Derived Nano-Catalytic Reactions." Ribarchik is also employed by the US Forest Service as a part-time bush pilot.

Shai Simonson (MS '82, PhD '86) recently published the book *Rediscovering Mathematics: You Do the Math* through the Mathematical Association of America.

William Schonberg (MS '83, PhD '87), professor and chair of the civil, architectural, and environmental engineering department at Missouri University of Science and Technology, received the NASA Engineering and Safety Center Honor Award.

Steven D. R. Carnes ('84, Kellogg '89, MME '90) is a technology transfer consultant at Fuentek, an intellectual property and technology management consulting firm.

Yie-Hsin Hung ('84) was named CEO of alternative investments for New York Life Investments. He was formerly global head of strategic acquisitions and alliances for Morgan Stanley Investment Management.

William Kornegay Jr. ('85) was appointed senior vice president of supply management at Hilton Worldwide. He was previously senior vice president at Godiva Chocolatier.

Mark A. Moore ('86) was named senior vice president of engineering for ENXSUITE. Previously he was vice president for ScaleDB.

Christopher J. Sommers ('86) was promoted from senior vice president of business development to CEO of ThinkFire Inc., an intellectual property advisory and brokerage firm.

Clifford R. Perry III ('87) of Chicago is a partner with the law firm Laner Muchin. He was named one of the top attorneys in Illinois for 2010 by Illinois Super Lawyers. He has represented employers in state and federal courts in the United States and before numerous local, state, and federal administrative agencies.

Sigfrid A. Muller Jr. ('88) was named vice president of business development at Blue Cross and Blue Shield of Minnesota. She was previously vice president of marketing for mPay Gateway.

K. Sujata (PhD '89), director of programs for the Eleanor Foundation, was named president of the Chicago Foundation for Women.

Suk-Chung Yoon (MS '89, PhD '91), professor and chair of computer science at Widener University, was selected to join the 2010-11 class of the American Council on Education Fellows Program.

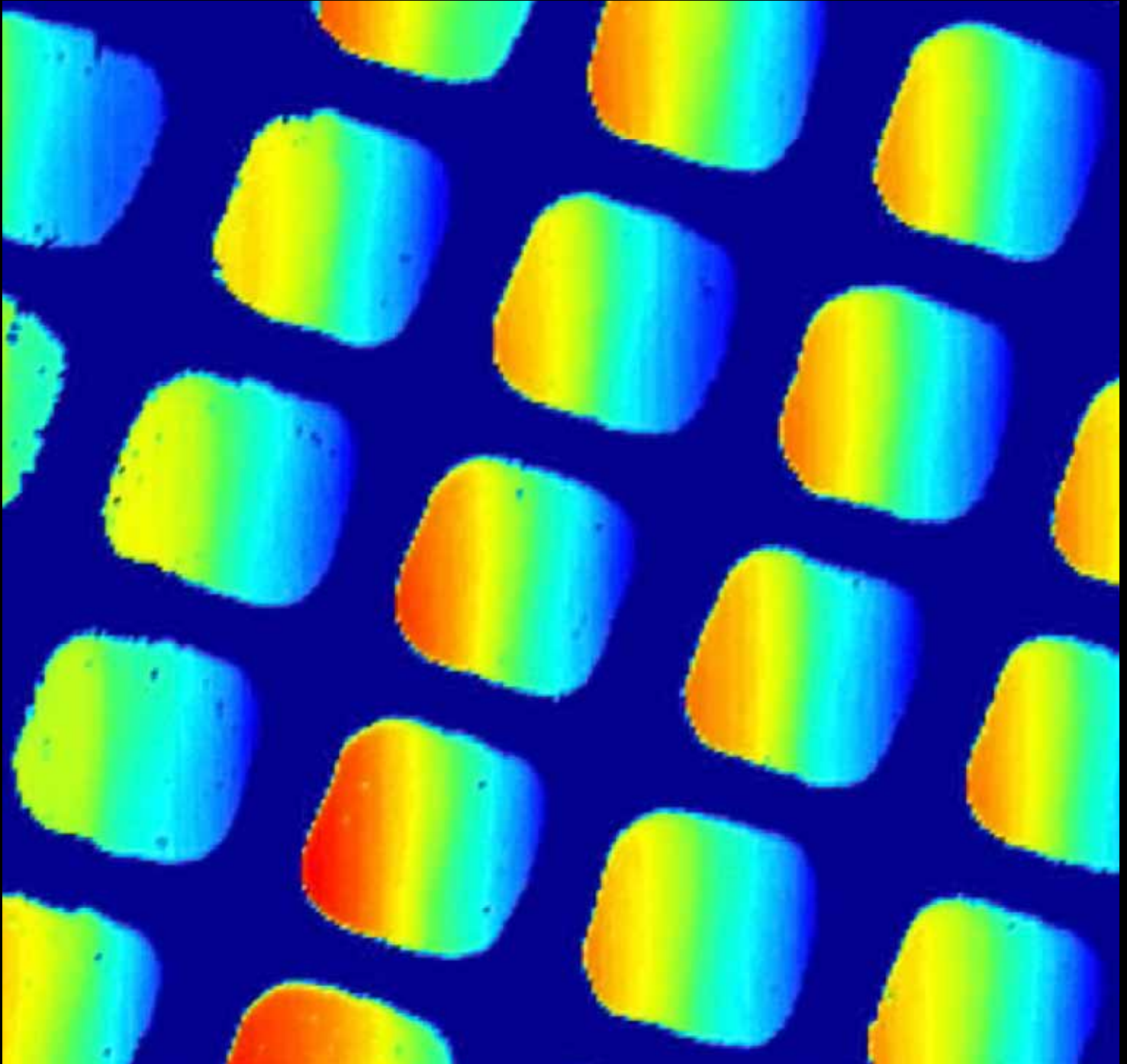
1990s

Henry (Hank) Marcy (PhD '90) has recently taken the position of senior vice president, product design and engineering, at Bissell Homecare Grand Rapids, Michigan.

Sizwe W. Mncwango ('90, MS '90), chairman of Proactive Health Solutions, was elected to the board of directors of Omnia Holdings.

Matthew Birkelund McCall (Kellogg '91, MEM '92, Kellogg '92) has seeded a new startup called Brighttag, which helps website operators police Internet marketers.

James Charles Brailean (PhD '93), chief executive office and cofounder of PacketVideo, was elected to the board of directors of Sonic Solutions.



the art of engineering

Research at McCormick pushes frontiers and crosses disciplines—and along the way it may produce images of significant aesthetic value. These images may suggest new questions, generate or reveal new information, convey new meaning, and generate new connections. Many—like the one shown here—can be considered pieces of art in their own right.

This image shows the electrical current within an organic photovoltaic cell at the nanometer scale. Using a specialized technique, atomic-force photovoltaic microscopy, researchers in the laboratory of Mark Hersam, professor of materials science and engineering, chemistry, and medicine, can characterize the behavior of photovoltaic cells. This understanding allows researchers to design more efficient materials for solar energy. Read more about Hersam's research on page 16.

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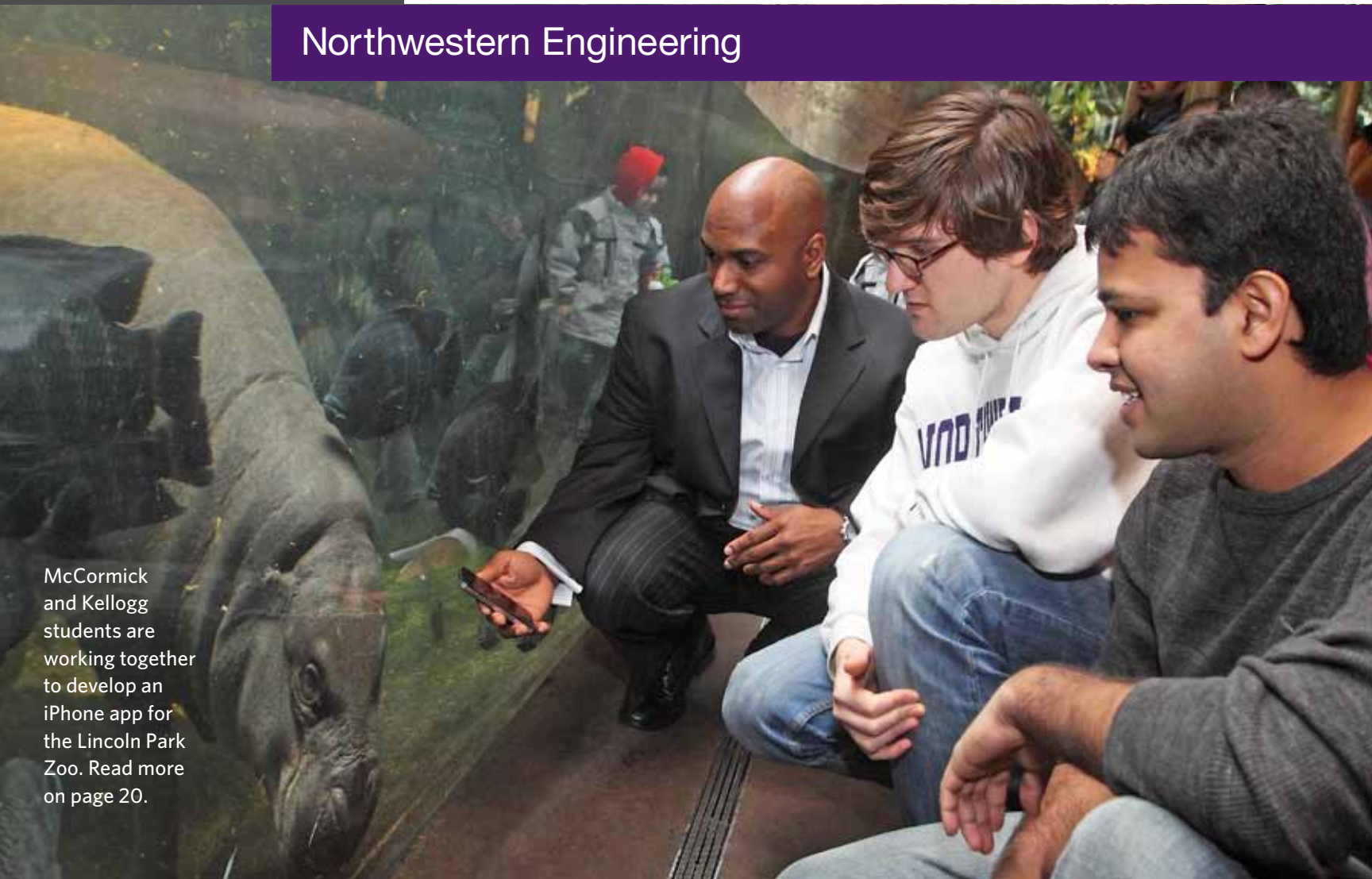


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A photograph showing three men in a museum setting. On the left, a man in a dark suit is kneeling and holding a smartphone, showing something on the screen to two other men. The man in the middle is wearing a white hoodie with "NORTHWESTERN" printed on it and glasses. The man on the right is wearing a grey sweater. They are all looking at the phone. In the background, there is a large mural of a rhinoceros and other animals in a naturalistic setting.

McCormick and Kellogg students are working together to develop an iPhone app for the Lincoln Park Zoo. Read more on page 20.