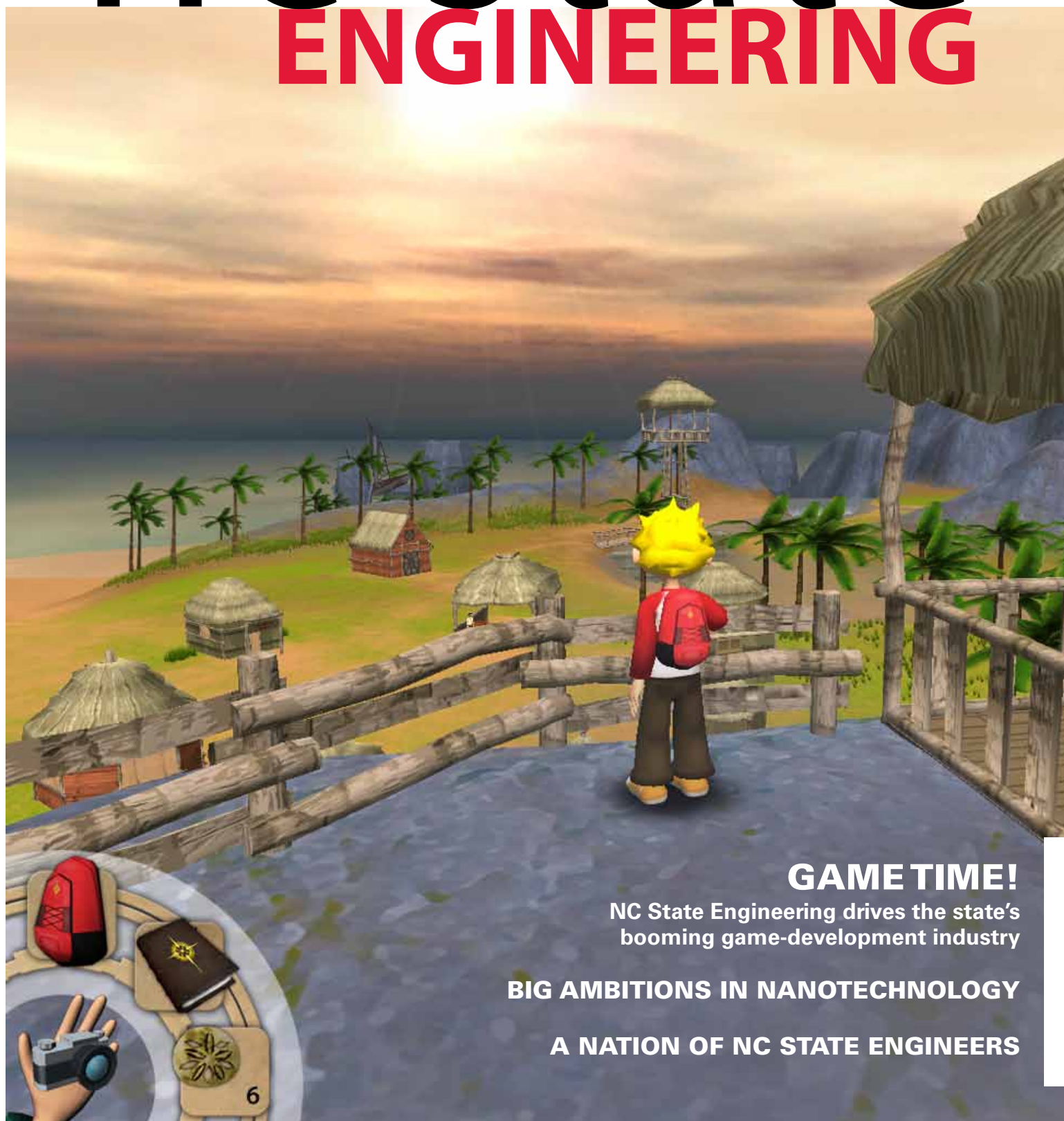


nc state

ENGINEERING



GAMETIME!

NC State Engineering drives the state's
booming game-development industry

BIG AMBITIONS IN NANOTECHNOLOGY

A NATION OF NC STATE ENGINEERS

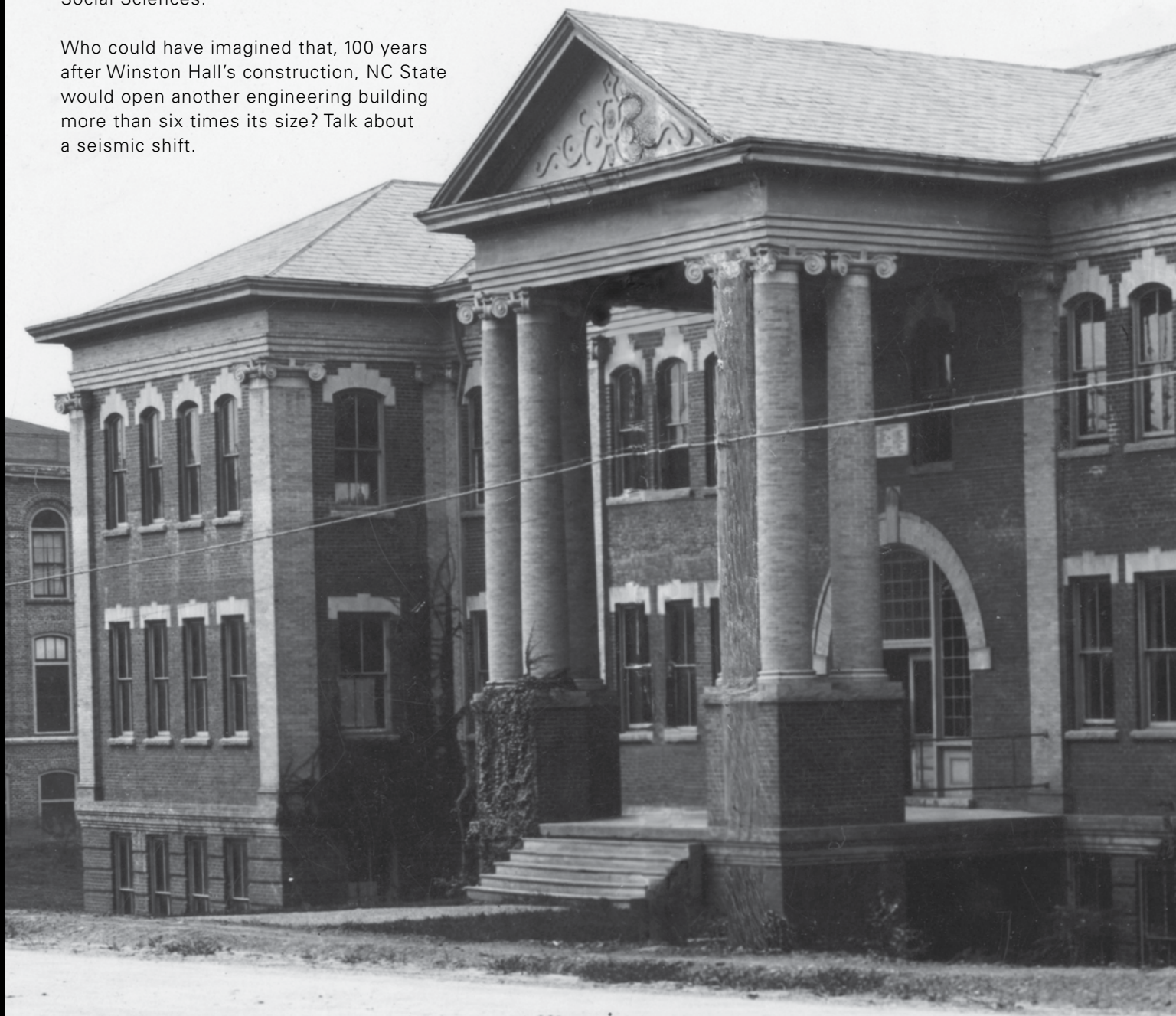
CENTURY MARK

When NC State officially opened the 248,000-square-foot Engineering Building III in September 2010 (right), it represented an important milestone. At that moment, more than half of the College of Engineering had moved to Centennial Campus. The center of gravity for NC State engineering had shifted.

There was another seismic shift 100 years ago. In 1910, the 37,000-square-foot Winston Hall (below) opened as the first building on campus primarily devoted to engineering activities; namely, electrical engineering, civil engineering, and the chemical department of the State Experiment Station.

Engineering eventually moved out of Winston, which sits along Hillsborough Street, and today the building is part of the College of Humanities and Social Sciences.

Who could have imagined that, 100 years after Winston Hall's construction, NC State would open another engineering building more than six times its size? Talk about a seismic shift.



FEATURES

16 GAME TIME!

NC State faculty, students and alumni are driving growth in the state's game-development industry.

20 A NATION OF NC STATE ENGINEERS

Nearly 50,000 Wolfpack engineering and computer science alumni are found in all corners of the US.

22 TINY MATERIALS, BIG AMBITIONS

NC State engineers play key roles in the university's top-flight nanotechnology efforts.

26 TRAINING FOR A CLEANER FUTURE

The NC Solar Center is training state residents for jobs in the burgeoning green economy.

28 SMART CAREER MOVE

How NC State engineering students built one of the nation's largest engineering career fairs from scratch.

DEPARTMENTS

03 FROM THE DEAN

The state budget, faculty successes and more college news.

06 PACK POINTS

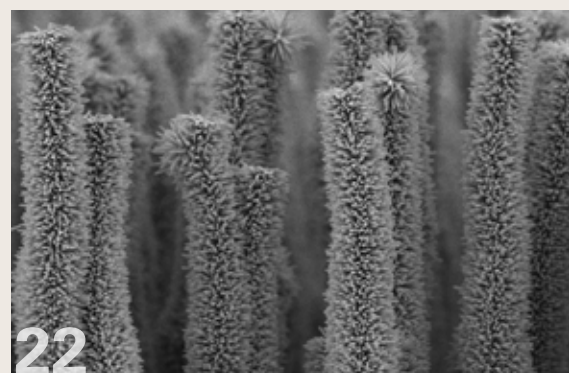
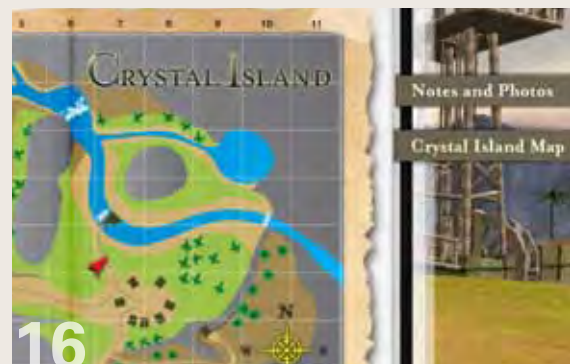
News, notes and research highlights.

32 FOUNDATIONS

Remembering a beloved faculty member, NC State's partnership with ABB, and alumni news and features.

INSIDE BACK COVER BY THE NUMBERS

A look at some of the figures that shape the College of Engineering.



ON THE COVER: The Crystal Island educational game series created by NC State computer scientists has been used by more than 1,000 elementary- and middle-school students (see page 16).

DEAN Dr. Louis A. Martin-Vega

ADVISORY BOARD

Dr. Richard Keltie, Associate Dean for Research and Graduate Programs

Ben Hughes, Executive Director of Development and College Relations

S. Frank Culberson (CHE '60), President, Board of Directors,
NC State Engineering Foundation Inc.

Martin Baucom, Associate Executive Director of Development, Director
of Corporate and Foundation Relations

Gwen Bell, Manager, Business and Operations

EDITOR Jennifer Weston

ASSOCIATE EDITOR Nate DeGraff

MAGAZINE DESIGN DIRECTOR Natalie Scott Brown

GRAPHIC DESIGN DIRECTOR Mark Ransom

STAFF WRITER Jessica Wilson

CONTRIBUTING WRITERS Barrett Brown, David Hunt, Tracey Peake,
Dave Pond, Matt Shipman, Irecka Smith, Ken Tate

IMAGES Annie Antón, Scott Ballew, Gregory Buckner, Nate DeGraff,
Andrew DiMeo, FREEDM Systems Center, Rebecca Kirkland, Maryland
SHA, Bradford Mott, NC State Libraries, Gregory Parsons, Michael Reep,
Spark Plug Games, University Archives, Roger Winstead, Yara Yingling

OFFICE OF THE DEAN

College of Engineering
Campus Box 7901, NC State University
Raleigh, NC 27695-7901
919.515.2311
www.engr.ncsu.edu

NC STATE ENGINEERING FOUNDATION INC.

Campus Box 7901, NC State University
Raleigh, NC 27695-7901
919.515.7458
www.engr.ncsu.edu/foundation

CHANGE OF ADDRESS? Visit www.engr.ncsu.edu/alumni or send
address corrections to alumnianddonor_records@ncsu.edu; or call
919.515.7458, toll free: 866.316.4057.

NC State University is an equal opportunity and affirmative action
employer and is dedicated to equality of opportunity within its community.
Accordingly, NC State University does not practice or condone discrimi-
nation, in any form, against students, employees, or applicants on the
grounds of race, color, national origin, religion, sex, sexual orientation, age,
veteran status, or disability. NC State University commits itself to positive
action to secure equal opportunity regardless of those characteristics.

© 2011. This document was produced by the NC State Engineering
Foundation Inc. and Engineering Communications. No state funds were
used; 53,000 copies of this document were printed at a cost of \$25,888
on recycled paper.

Did you know?

Did you know that the world's first modern electric guitar was
designed and built by an NC State electrical engineering student? In
1940, William Sydney Wilson crafted a rudimentary guitar body out
of a solid block of wood and put an individual pickup on each string,
resulting in improved sound quality over other electric guitars.

The invention won first place at the 1940 NC State Engineering Fair,
but since Wilson didn't patent his invention (an uncommon practice
for academics at the time), companies such as Gibson and Fender
later incorporated similar designs into their legendary guitars. But
lately Wilson has been getting his due. His invention was part of a
recent historical exhibit at NC State's DH Hill Library and now has a
permanent home in the University Archives.

FROM THE DEAN



Louis A. Martin-Vega

Welcome to the spring issue of *NC State Engineering*.

No doubt many of you have been following the economic
situation and the impact it is having on the state's budget,
including funding for our university. NC State is fortunate
to have strong leadership in place to guide us through the
coming changes necessary to weather the budget cuts and
remain a strong university. I encourage you to follow the
university's progress at www.ncsu.edu/budget. Please be
assured that we are doing everything possible to maintain
the high quality of our academic programs and ensure that
students continue to succeed.

While the budget situation has required attention, the College continues to celebrate suc-
cesses. In this issue you will read about four more of our young faculty who have received
prestigious National Science Foundation CAREER awards, a senior faculty member who
was inducted into the *Electronic Design* Engineering Hall of Fame, and a student team that
took first place in a national biomedical engineering competition.

We have also highlighted our proposed Digital Games Research Center, which has played
an important role in making North Carolina a national hub for the digital gaming industry,
and our research initiatives in nanotechnology. You'll also read about innovations in medical
devices, DNA self-assembly modeling, and the use of sound waves to detect land mines
and save soldiers' lives. And we take a look back at the beginnings of our highly successful
Engineering Career Fair.

Our alumni are the focus of our centerpiece article. Check your area on the map to see if
you are in a hot spot of NC State engineering graduates. And in our Foundations section
you can remember Dr. George Roberts, read about our power engineering partnership with
ABB, and learn how professorships bring top faculty to NC State.

Much of the work you will read about in this issue is conducted on Centennial Campus.
And if you haven't seen Centennial Campus and the new buildings that are home to six of
our departments, I encourage you to do so. We continue to work toward the goal of moving
the entire College to Centennial in the coming years. To do so will require support from the
state as well as our alumni and friends. We believe it is a challenge that must be met for the
continued success of our students and faculty.

I hope that you will enjoy this issue of the magazine and come away with a renewed sense
of pride in your college.

Louis A. Martin-Vega, Dean

Decorations for communications

We're pleased to report that this magazine
landed another award in this year's District
III Council for Advancement and Support of
Education (CASE) awards contest, adding to the
two it won in the same event in 2010.

This year, *NC State Engineering* won an
Award of Excellence for magazines published
for institutions or colleges with an enrollment of
5,000 to 10,000.

The office that produces the magazine,
Engineering Communications, also won an
Award of Excellence for the design of a new
recruiting brochure used to help draw top
undergraduate students to NC State.

We take these awards seriously; they show
that our publications are eye-catching, innova-
tive and, best of all, interesting. We hope you
enjoy this issue of *NC State Engineering* as much
as we've enjoyed producing it. ■



Q & A

Questions for **CHRISTINE GRANT**

Dr. Christine Grant brings people together. The associate dean of faculty development and special initiatives and professor of chemical and biomolecular engineering talks about helping NC State engineering faculty maximize their considerable talents.

How do you help NC State engineering faculty succeed?

There is tremendous talent and experience in this College, and my goal is to connect faculty seeking knowledge with those who already have it. We call them sages, and they have a wealth of information about various aspects of faculty life, from taking a meaningful sabbatical to landing certain grants.

What are some tools you've used to help faculty take advantage of the resources here?

One example was the program we held on getting an IGERT proposal funded by the National Science Foundation (NSF). We pulled together our dean and others with significant IGERT experience and had a great discussion. Faculty members found it incredibly useful for NSF proposal preparation.

You also take faculty members to funding agencies.

That's the most important thing we do. This winter, for instance, we brought about 30 faculty to NSF's headquarters in Washington, DC. The group learned what it takes to get NSF funding, and some of them got opportunities to review grant proposals and serve on panels. We also organized presentations by several other funding agencies.

Why is it so important to engage faculty like this?

Because a faculty member's life is so complex and demanding. It's very competitive, especially for junior faculty. Anything this College can do to empower faculty, even by just pointing them to someone who can help, is going to enhance their careers.

The PURPOSE Institute located at NC State, which you founded and lead, focuses on recruiting and retaining science and engineering faculty from underrepresented groups. How are you working to accomplish these goals?

One of our primary activities has been a series of summits that bring underrepresented minority women engineering faculty from across the country together. We've covered a lot of ground, including peer mentoring and navigating a successful academic career. We'll hold our next summit this summer here at NC State, and we'll focus on collaborations with other faculty groups on campus.

Why is bringing people together so rewarding for you?

It's about relationships. I'm a chemical engineer, and like other areas of engineering, chemical engineers generally go to the same conferences and see the same people. There may be great collaborators or mentors out there for you, but if they're in other fields you may never find them. We want to build relationships by pushing people out of their discipline- and university-specific silos. 🗨️



IN THE NEWS

Experts at the ready

As the crisis at the Fukushima Daiichi nuclear power plant in Japan unfolded following the devastating earthquake and tsunami, media turned to NC State engineers to help the public make sense of the situation.

Faculty from the departments of nuclear engineering and civil, construction, and environmental engineering offered insight and analysis for *USA Today*, the *Charlotte Observer*, *WRAL*, *NBC-17*, and the *Daily Beast*, among other sources.

See many of these stories at the “In the News” link at news.ncsu.edu. ■



NC State Engineering ranked 15th in WSJ survey

The Wall Street Journal confirmed last year what NC State engineering alumni have known all along: companies love hiring our students.

NC State ranked 15th among the nation's engineering schools in a study published in the *Journal* in September. The paper surveyed 479 recruiters from the nation's largest public and private companies, nonprofit organizations and government agencies.

Among public schools, NC State engineering ranked 12th nationwide. ■



Turning left just isn't right

A new study from NC State civil and transportation engineers shows that so-called “super-streets” — intersections that reroute left turns from side streets and employ U-turns to keep traffic moving smoothly and safely — are indeed super time savers.

The intersections offer a 20 percent overall reduction in travel time compared to similar intersections that use conventional traffic designs, the engineers found. And there are 46 percent fewer reported automobile collisions.

ABC News and the *News & Observer* picked up on the study. ■

Memory masters

The *BBC* reported NC State electrical and computer engineers' development of a new device that represents a significant advance for computer memory, making large-scale “server farms” more energy efficient and allowing computers to start more quickly.

Traditionally, so-called “slow” memory devices are used in persistent data storage technologies such as flash drives and allow us to save information for extended periods of time. “Fast” memory devices allow our computers to operate quickly, but aren't able to save data when the computers are turned off.

But now the NC State engineers have developed a single “unified” device that can perform both types of operations and may be used in a computer's main memory. ■



Homeless for the holidays

An NC State engineering alumnus lived in his car to raise awareness for the homeless.

NC State engineering alumnus Will Langley took to the streets – literally – to raise the profile of the growing number of unsheltered homeless residents and their daily, harsh realities in the local community.

Langley, a Raleigh graphic designer who double-majored in civil and environmental engineering, went “Homeless for the Holidays” for seven days in late November and early December with only a \$20 bill and a single tank of gas. Langley lived in his car, lent a hand to local organizations aiding the homeless and forwent public assistance.

“For a while now, I have been looking for a way to get involved, needing more fulfillment in my life,” Langley said as he began his week on the streets. “At the same time, I’ve started to see more and more people on the streets – because of the foreclosure crisis and the recession, there’s this burgeoning group of newly homeless or under-housed people who, a couple months ago, were doing fine, as far as car payments and mortgages were concerned.”

So Langley pitched the project to his bosses at Capstrat, a Raleigh-based

communications agency. The agency was supportive and set up a blog and a website for the project, where Langley provided real-time updates via Facebook, Twitter, Flickr and a “Where’s Will?” GPS-tracking page. He even set up a live in-car video feed and posted video profiles of some of Raleigh’s homeless residents.

Langley said he just wanted people to get to know those less fortunate around them.

“Everybody’s got a mom. Everyone’s got ideas, opinions, favorite colors and those kinds of things,” said Langley. “I really hope to dispel the myths and stereotypes that are so prevalent and help humanize the people I’m talking to and share their individual stories.”

Langley has remained an advocate for the homeless following his week on the streets, and his website continues to foster discussion on the topic. It also serves as a resource for those who want to volunteer or give to organizations that fight homelessness.

For more information, check out homelessfortheholidays.com. ■



Trekking for kids

Talk about the trip of a lifetime. Dr. Annie Antón (center left in photo), professor of computer science at NC State, trekked through the Himalayas of Nepal to the base camp of Mount Everest last fall. And she did it for a good cause.

Antón and 21 other trekkers were participating in a trip offered by Trekking for Kids, a non-profit that raises money for orphanages by organizing adventure trips in some of the world’s most remote locations. Antón and her fellow trekkers raised more than \$57,000 for the Orphan Children Rescue Center in Bhaktapur,

Nepal, near Katmandu. It was Antón’s third trek with the organization; she serves as its corporate secretary.

After arriving in Nepal in late October, Antón and the other trekkers visited the orphans, toured the new construction at the center, were treated to a talent show by the children, and took the children out for a day-long field trip.

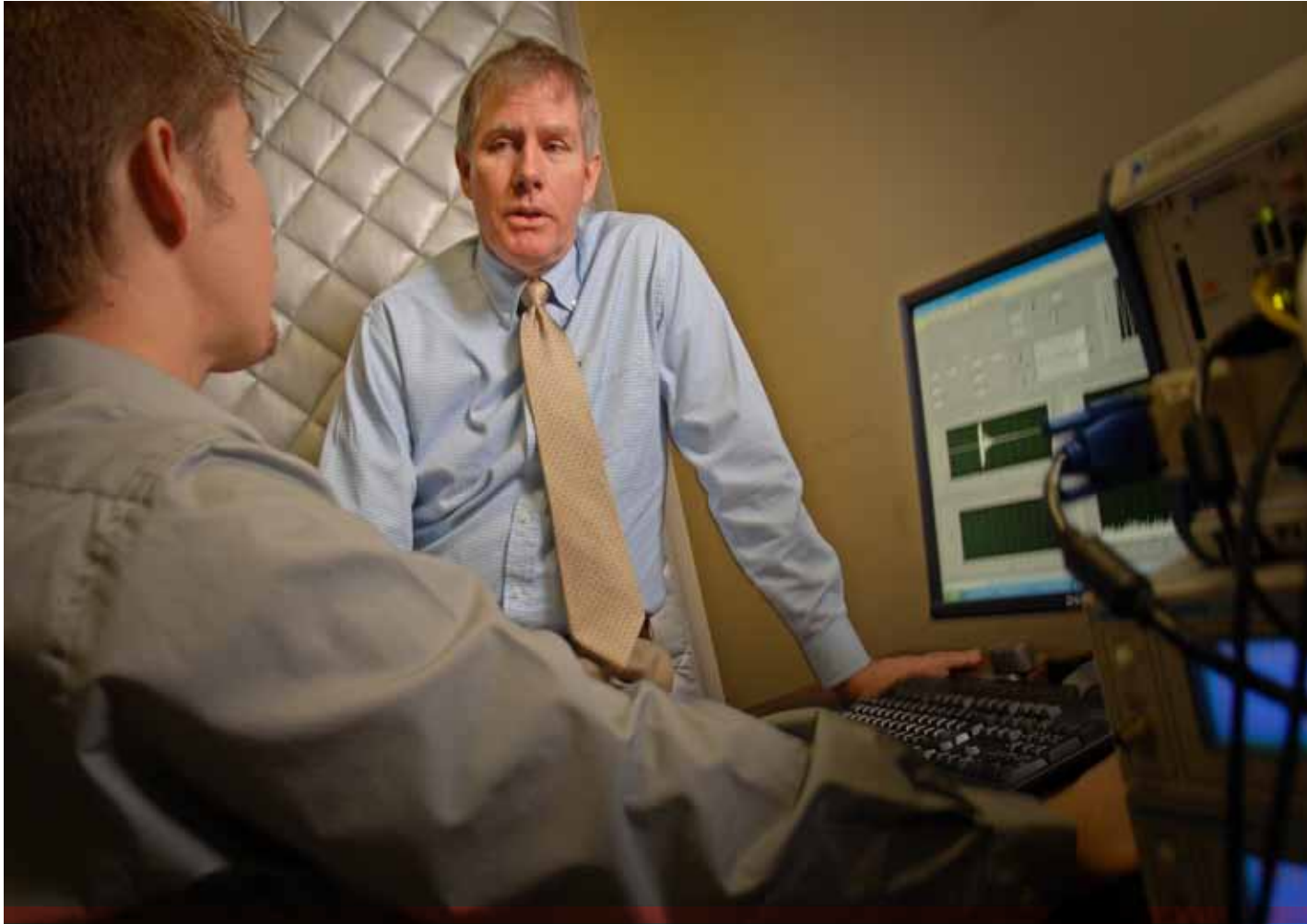
Then the group flew to Lukla’s Tenzing-Hillary Airport, in eastern Nepal, for nine days of hiking before reaching the Everest Base Camp at about 17,500 feet. From there, Antón and her fellow trekkers completed the ascent of the 18,500-foot Kala

Patthar mountain, which offers incredible views of Everest, the world’s tallest mountain.

Through Facebook and Twitter, Antón was able to periodically communicate her progress to people around the world. Following the trek, the group returned to Bhaktapur to spend more time with the children, rolling up their sleeves for a work day of painting at the orphanage.

“(Twenty-one) Trekkers enjoyed our last day with the kids at the Orphan Children Rescue Center,” Antón wrote on Facebook on Nov. 5. “Tomorrow we start heading to the airport for our long journeys home.” ■





Sound research for the military

Imagine a tool that uses sound waves to help identify land mines, roadside bombs or suicide bombers. NC State received a grant from the US Office of Naval Research to turn that idea into a reality.

“The idea is to develop a tool that will identify things that are unusual,” said Dr. Michael Steer, Lampe Professor of Electrical and Computer Engineering at NC State and the primary investigator of the research effort. “As a result of this work, we hope that one day our soldiers will have pocket-sized devices that can warn them of nearby roadside bombs and suicide bombers. If you’re a Star Trek fan, we’re trying to build a real-world tricorder.”

NC State is the lead institution in a multi-university collaborative effort that

has been awarded \$4.3 million over the next three years under a Multidisciplinary University Research Initiative grant, which may be extended for an additional two years and \$2.8 million. NC State researchers will receive approximately \$1.9 million over the first three years of the grant. Purdue, Georgia Tech and the Colorado School of Mines are also part of the research effort.

“We hope to advance our fundamental understanding of how sound interacts with air, soil and solid objects — understanding that can be applied to many different areas,” Steer said.

Steer, who previously received the US Army Commander’s Award for Public Service for his groundbreaking work in the field, explained that the researchers hope

to develop the means to use acoustics to identify objects in the environment and make them vibrate or emit energy so that they can be detected using other tools. For example, Steer said, “we think we’ll be able to use sound waves to make land mines vibrate so they can be detected by radar. That would have significant humanitarian applications.”

Dr. Mohammed Zikry, Zane Prevoost Smith Distinguished Professor in Mechanical Engineering, and Dr. Hamid Krim, professor of electrical and computer engineering, are also involved with the project. ■

A heart smart invention

A research team led by Dr. Gregory Buckner, professor of mechanical and aerospace engineering at NC State, is developing a new computerized catheter that could make the surgical treatment of a heart disorder that affects more than two million Americans faster, cheaper and more effective — while significantly decreasing radiation exposure related to the treatment.

The disorder, atrial fibrillation, occurs when random electrical activity in the upper chambers of the heart, the atria, causes the heart to operate less efficiently. It can lead to lightheadedness, fatigue and even blood pooling in the heart, which contributes to blood clots and increased risk of stroke.

Doctors have developed cardiac ablation techniques that mitigate fibrillation by manually guiding catheters through the heart and then using extreme heat or cold to create small scars through the walls of the affected atria. These scars block the problematic electrical signals. Throughout these prolonged procedures, doctors use

X-rays to track the tip of the ablation catheter — exposing the patient and medical personnel to radiation.

Existing ablation catheters operate by painstaking manual control and can only bend in one or two directions. But the robotic ablation catheter developed by Buckner’s team uses “smart materials” to provide significantly improved maneuverability, computer-controlled capabilities, and the potential to reduce procedure times and improve patient outcomes.

The “smart materials” act as internal muscles, contracting when electrical currents are applied. This allows the catheter to bend in any direction. Furthermore, doctors can use a specialized joystick to locate key points within the atrium. A computer program can then trace a curve along those points, creating continuous lesions of scar tissue that will block the electrical signals causing fibrillation.

The research team, which includes physicians from NC State’s College of Veterinary Medicine and Duke University’s Medical Center, received a \$1.1 million Phase II

Small Business Innovation Research grant from the National Institutes of Health in 2010 to take their “robotic catheter” prototype from the lab and put it into the hands of doctors. Surgical evaluations of the prototypes begin this year. ■



The future of cyberinfrastructure

Dom Sagolla, co-creator of Twitter and founder of DollarApp, delivered the keynote address during NC State’s Cyberinfrastructure (CI) Days at NC State’s Stewart Theatre in September.

Sagolla’s address, “Beyond the Web,” placed the Internet in historical context from its inception by specialist experts to its near ubiquity in developed society. Sagolla also illustrated how today’s Web is just a glimpse of the marvels around the corner.

CI Days focused on how CI — computers, software, networks and people — affects the way we think, create, govern and do business. Over the course of the event, experts from around the country discussed CI opportunities and challenges on issues

ranging from public health to eGovernment to video games.

The event was also intended to help the NC State campus community use its sophisticated CI to the fullest and provided a chance for the campus and surrounding community to glimpse the future and pose questions about it.

CI Days was sponsored by the Office of Information Technology and the Institute for Computational Science and Engineering, which landed a grant from the National Science Foundation to hold the event. Dr. Phillip Westmoreland, professor in the Department of Chemical and Biomolecular Engineering, is the institute’s executive director. ■



An international first

NC State is the nation's first university to go international with its nuclear reactor program. The university has started a partnership with the Jordan University of Science and Technology (JUST) that allows students there to gain experience with the NC State nuclear reactor through a web-based interface. Officials from NC State, including Dr. Yousry Azmy, head of the Department of Nuclear Engineering, and Dr. Louis Martin-Vega, dean of the College of Engineering (left and right, respectively, below), gathered in its nuclear reactor control room for a teleconference with officials from JUST, one of Jordan's top universities, to officially launch the program Nov. 1.

Dr. Ayman Hawari, professor of nuclear engineering and director of the nuclear reactor program at NC State, represented NC State on the Jordanian side of the teleconference. The relationship represents the first time a US research nuclear reactor will be used for educational purposes outside the United States. The initiative is essentially an extension of the relationship NC State has with other universities that don't have nuclear reactors, such as Georgia Tech and Tennessee. NC State nuclear engineers created a virtual version of the reactor's data, control and readout systems so students in other locations can take classes over the Internet.

Hawari worked with officials at the US Dept. of State and the International Atomic Energy Agency (IAEA) to establish the program. Hawari is an advisor for the IAEA and serves on the Jordan Atomic Energy Commission, which is coordinating the country's plan to build a peaceful nuclear energy program. Jordan hopes to open its first nuclear reactor within the next decade. The agreement represents another milestone for NC State's nuclear engineering program, which is among the nation's best. In 1953, NC State opened the first university-based nuclear reactor in the world, and the current PULSTAR reactor in Burlington Engineering Laboratories remains one of the nation's few on-campus nuclear reactors. ■



The eyes have it

When a team of undergraduates announced the results of their senior research project, there wasn't a dry eye in the house. That's because the NC State biomedical engineering students (right) had developed a special lens for patients suffering from forms of paralysis that leave them unable to blink and hydrate their eyes. Their work led to a \$10,000 first-place finish in a national contest and the possibility of relief for the paralyzed. Adviser Andrew DiMeo assigned the five team members, who shared an interest in neurology, to visit WakeMed Hospital to find a real-life problem to solve. Eli Pollack, Alex McGaughy, Roya Nezarati, Elizabeth Kirk and Trinh Doan went to WakeMed, where they saw a patient with an injury that affected his ability to blink. "The nurses were constantly applying drops, Vaseline and covering his eyes with Saran Wrap to keep them hydrated," McGaughy said. "We found that this also happened to burn victims, or people with Bell's palsy, a condition that paralyzes certain muscles in the face."

Team members spoke with nurses and doctors in the neurology unit, as well as patients' family members and the Boston Foundation for Sight. With a helping hand from these experts and lab space from Aerie Pharmaceuticals, the students created the HydrEye CorneOasis, a special hybrid contact lens that fits over the eye and holds moisture against it, preventing the eye from drying out. While the team was working on the project, DiMeo encouraged them to enter the competition, a brand new undergraduate contest modeled after a prestigious biomedical design competition for graduate students. The team won first place in the inaugural BMESTart competition, which attracted competitors from across the country. A portion of the prize money will go toward continued development of the lens. ■



Expanding online horizons

The Engineering Online distance education program now offers 14 master's degree programs and a diploma in construction project management.

The Engineering Online program at NC State, one of the largest engineering distance education programs in the nation, now offers 14 master's degree programs and a construction project management diploma program. Engineering Online has expanded its master's programs over the past two years to include computer networking, environmental engineering, industrial engineering and integrated manufacturing systems engineering. The program, designed for working professionals, allows students to earn master's degrees in engineering without coming to campus. Another new addition, the construction project management diploma program, provides construction professionals with the knowledge and skills needed to operate firms more efficiently and profitably. The non-credit diploma program requires the completion of five courses in areas ranging from blueprint reading to construction safety.

Courses offered by Engineering Online at NC State are identical to on-campus courses in terms of content, requirements and academic rigor. Lectures presented to an on-campus class are captured, digitized and placed on the Internet for distance students to view from any location that has a high-speed connection. The program enrolled more than 1,200 students in 2009-10, including residents from 65 of the state's 100 counties. In addition to the new programs, Engineering Online offers master's degree programs in aerospace engineering, civil engineering, chemical engineering, computer engineering, computer science, electrical engineering, materials science and engineering, mechanical engineering and nuclear engineering. The program also offers a master of engineering degree. Learn more about the program at engineeringonline.ncsu.edu. ■



Show and tell

News outlets frequently cover plant closings and the shipping of manufacturing jobs overseas. So it might surprise you to learn that manufacturing is a robust part of North Carolina’s economy. To drive the point home, NC State’s Industrial Extension Service (IES), which is part of the College of Engineering, loaded up a giant trailer truck with products manufactured by North Carolina companies. That truck was driven all over the state last fall, from High Point out to Fletcher, then back to Lillington and down to Leland, showing off the truckload of goods to enthusiastic crowds.

At nearly a dozen different stops, IES visited manufacturing plants responsible for vital products and even more vital jobs, like PolyChem Alloy in Lenoir, maker of specialty compounds for the plastics industry, and Tyco/Scott Health & Safety in Monroe, maker of respirators for firefighters. The message of the tour was simple: “Manufacturing Makes It Real.” Governor Beverly Perdue even declared the week of Sept. 27 “Manufacturing Makes It Real Week” in North Carolina. It’s a message that seems to be gaining traction. IES picked up followers along the way, including a school bus manufactured

by Thomas Built Buses of High Point and a Krispy Kreme truck out of Raleigh. Assorted trucks, trailers and military vehicles also joined the convoy before it headed back to the Triangle. The tour finished up with a rally on the steps of the legislative building in Raleigh. NC State University faculty and staff attended to get a firsthand look at some of the cool products that are native to North Carolina, which included everything from suspension systems for heavy equipment to kitchen and bath fixtures. ■

Going solar at FREEDM



The NSF FREEDM Systems Center is now solar powered. Crews from AEG Power Solutions, one of the center’s industry partners, worked with FREEDM engineers to design and install a 40-kilowatt solar array atop the smart grid center’s new headquarters at the Keystone Science Center on NC State’s Centennial Campus. The array supplements the center’s energy needs and is part of its 1-megawatt micro-grid that demonstrates next-generation solar integration onto the electric

utility grid and the FREEDM system’s potential for large-scale adoption. FREEDM engineers are working to revolutionize the country’s century-old power grid and speed renewable electric-energy technologies into homes and businesses nationwide by integrating innovative utility infrastructure, energy storage and control of energy flow. FREEDM was formed in 2008 by an \$18.5 million Engineering Research Center grant from the National Science Foundation. ■

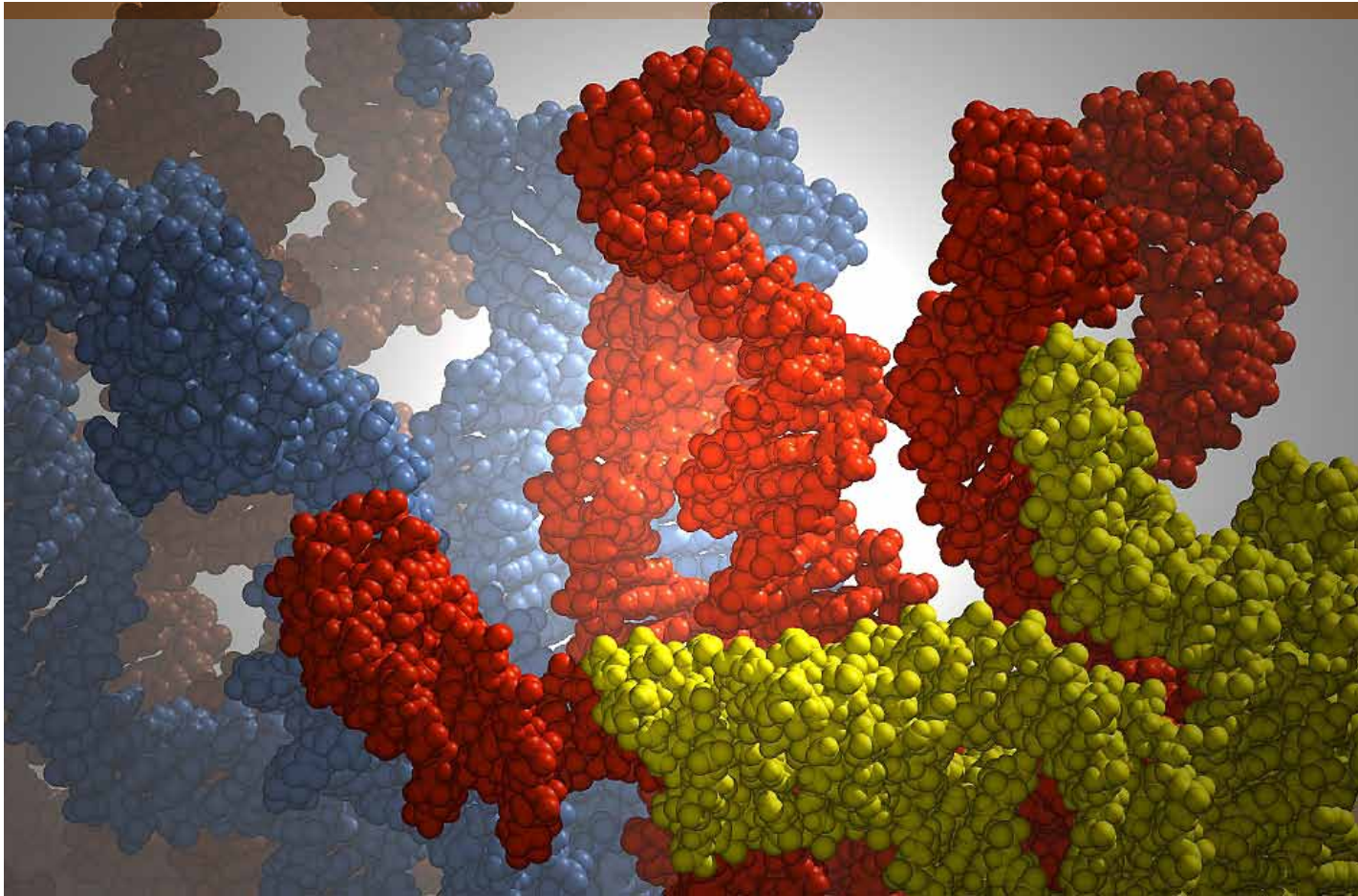


Building the big bridge

More than 400 people packed an NC State convention hall in September to hear the chief engineer behind the new Hoover Dam Bypass Bridge describe the planning, design and construction of the spectacular project. The address by David Goodyear, senior vice president of T.Y. Lin International, was the main event for the 2010 Paul Zia Distinguished Lecture Series in Civil Engineering and Construction, an annual event featuring prominent engineers in the field. Earlier in the day, more than 200 engineers attended lectures and workshops led by Goodyear and William Dowd, the project director for the bypass and executive vice president of HDR Engineering,

Inc. The events were held at NC State’s McKimmon Center. The 2,000-foot bridge over the Colorado River in the southwestern US opened to traffic in October after more than a decade of planning and construction. Its concrete arch span of 1,060 feet is the longest in the country and the fourth-longest in the world. The bridge, known formally as the Mike O’Callaghan – Pat Tillman Memorial Bridge, connects Nevada and Arizona just downstream from the Hoover Dam. The idea behind the bypass construction was to improve safety, security and traffic capacity on US 93, which had crossed over the dam itself and is now routed over the new bridge.

The Paul Zia Distinguished Lecture Series was established in 2002 to honor the accomplishments of Dr. Paul Zia, Distinguished University Professor Emeritus of Civil Engineering at NC State. Zia is a leading figure in the fields of concrete and structural engineering and served as head of the Department of Civil, Construction, and Environmental Engineering at NC State for nine years. He is a member of the National Academy of Engineering. The series was presented by the Department of Civil, Construction, and Environmental Engineering, the Constructed Facilities Laboratory, and the NC State Engineering Foundation. ■



Goldilocks found

DNA strands that are not too long, not too short, but just right.

NC State engineers have found a way to optimize the development of DNA self-assembling materials, which hold promise for technologies ranging from drug delivery to molecular sensors. The key to the advance is the discovery of the “Goldilocks” length for DNA strands used in self-assembly – not too long, not too short, but just right.

DNA strands contain genetic coding that will form bonds with another strand that contains a unique sequence of complementary genes. By coating a material with a specific DNA layer, that material will then seek out and bond with its complementary counterpart. This concept, known as DNA-assisted self-assembly, creates significant opportunities in the biomedical and materials science fields, because it may allow the

creation of self-assembling materials with a variety of applications.

While DNA self-assembly technology is not a new concept, it has historically faced some challenges. For example, DNA segments that are too short often fail to self-assemble, while segments that are too long have led to the creation of deformed materials. This hurdle can lead to basic manufacturing problems and significant changes in the properties of the material itself.

A team of researchers from NC State and the University of Melbourne in Australia has proposed a solution to this problem, using computer simulations of DNA strands to identify the optimal length of a DNA strand for self-assembly.

Strands that are too short or too long bond to each other, rather than to “partner”

materials, said Dr. Yara Yingling, an assistant professor of materials science and engineering at NC State and co-author of a paper describing the research.

Optimal lengths neither intertwine nor fold over on themselves, Yingling explained. That leaves them exposed and available to bond with the materials in another layer – the perfect situation for DNA self-assembly.

One potential application for such self-assembling materials is the development of drug-delivery vehicles. The technology is also expected to facilitate the creation of molecular sensors that use DNA to detect, and signal the presence of, clinically important biological molecules – which could have significant diagnostic applications in the medical field. ■

Baliga joins *Electronic Design* Engineering Hall of Fame



Dr. B. Jayant Baliga, Distinguished University Professor of Electrical and Computer Engineering, was inducted into the 2010 class of the *Electronic Design* Engineering Hall of Fame.

Baliga was honored for inventing the Insulated Gate Bipolar Transistor (IGBT), a landmark energy-saving semiconductor switch used in everything from light bulbs and washing machines to automobiles and heart defibrillators. His various power device innovations, including the IGBT, have produced a cumulative carbon emission reduction of more than 30 trillion pounds over the past 20 years. Baliga also directs NC State’s Power Semiconductor Research Center and is a member of the National Academy of Engineering. He joined the NC State faculty in 1988. ■

Khan receives RJ Reynolds Award



Dr. Saad A. Khan, Alcoa Professor in the Department of Chemical and Biomolecular Engineering, was named the 26th recipient of the RJ Reynolds Tobacco Company Award for Excellence in Teaching, Research and Extension. He will receive a \$25,000 prize distributed over five years.

Khan is an internationally renowned scholar in the areas of soft solids, gels, colloids and associative networks. He leads his department’s graduate program and has organized international meetings in his field, amassed more than 140 peer-reviewed publications and been issued 16 patents. Khan came to NC State in 1993. ■

Four faculty receive NSF CAREER Awards



Four NC State engineering faculty members landed National Science Foundation Faculty Early Career Development Awards over the winter.

Known as NSF CAREER Awards, they are given to junior faculty who exemplify their teacher-scholar role through outstanding research and education and integrate those activities within the context of the missions of their organizations. CAREER Awards are NSF’s most prestigious awards for young faculty in science and engineering.

NC State’s recent award winners are (from left to right, above) Dr. Aranya Chakraborty, assistant professor in the Department of Electrical and Computer Engineering; Dr. Joseph DeCarolis, assistant professor in the Department of Civil, Construction, and Environmental Engineering; Dr. Scott Ferguson, assistant professor in the Department of Mechanical and Aerospace Engineering; and Dr. Joseph Tracy, assistant professor in the Department of Materials Science and Engineering. ■

GAME TIME!

NC STATE IS FUELING BIG-TIME GROWTH IN NORTH CAROLINA'S GAMES INDUSTRY.

THE CRYSTAL ISLAND EDUCATIONAL GAME SERIES (OPPOSITE PAGE) DEVELOPED BY DR. JAMES LESTER AND HIS RESEARCH GROUP HAS BEEN USED BY MORE THAN 1,000 ELEMENTARY- AND MIDDLE-SCHOOL STUDENTS OVER THE PAST SEVERAL YEARS. BELOW, A MAIN CHARACTER FROM THE GAME.



COMPUTER SCIENCE ALUMNUS JOHN O'NEILL FOUNDED SPARK PLUG GAMES, PART OF THE GROWING GAMES INDUSTRY IN THE TRIANGLE.

John O'Neill builds video games for a living. And not just the games with heroes and villains (though he creates plenty of them), but also ones that promote brands, train employees and educate students.

O'Neill, the founder and president of Cary's three-year-old Spark Plug Games, is in many ways emblematic of the Triangle's burgeoning games industry. The area is home to dozens of gaming companies and one of the industry's premier conferences, and it's at the forefront of the "serious" game development that's become so important to the success of businesses and schools.

But O'Neill sees another key player in the region's games industry. It's his alma mater, NC State, which is driving industry growth by making important research advances, graduating talented, well-rounded students and creating programs that foster innovation in the field.

"I love how much NC State is doing right now to spur company growth and support new ideas," said O'Neill, a 1996 computer science graduate.

With help from NC State and its engineering and computer science alumni, the Triangle games industry has exploded over the past decade. Drove of companies have relocated, expanded or started up in the area, and today about 40 games companies employing as many as 1,500 people have operations in the region. They include the headquarters of industry giant Epic Games and many smaller firms like Spark Plug that are playing increasingly prominent roles in the growing game-development field.

The growth has come amidst unprecedented change in an industry that was once associated with teenagers punching away at Nintendo and Sega consoles in their parents' basements. Today, the average gamer in the US is close to 35 years old, a potent purchasing demographic, and the industry has expanded into serious games that range from military simulations to surgical training to children's educational software.

The Triangle, and NC State in particular, have been quick to capitalize on gaming's growing popularity, and Dr. Michael Young,

associate professor of computer science and co-director of the proposed Digital Games Research Center (DGRC) at NC State, has been at the forefront of those efforts.

Young and others at NC State have worked with the business community to build a Raleigh game developers' conference into the premier event of its kind on the East Coast. Until this year, the event had been called the Triangle Game Conference, but it has grown so large that the third installment, in April, is called the East Coast Game Conference.

Young also sits on the board of the Triangle Game Initiative, which runs the conference and supported the establishment of new state incentives for gaming companies. The incentives, which began this year, provide companies with a 15 percent tax credit on compensation and wages for employees involved in digital media development and production.

The growth in gaming, and serious gaming in particular, has come about because video games are essentially learning machines, Young said. To succeed in Halo, Donkey Kong or any other game, players must learn rules, solve problems, reach goals, and understand how their actions affect the gaming environment. That's why schools, businesses and government agencies are increasingly incorporating games into their lessons and training programs.



GAME STATS

North Carolina's Triangle region has emerged as the game industry's East Coast hub, thanks in part to NC State computer scientists and engineers.

TOP 15

2011 ranking of NC State's undergraduate game development concentration in the Princeton Review's "Top Schools for Video Game Design Study".

FORTY

Approximate number of gaming companies in the Triangle.

15 PERCENT

New NC tax credit for companies involved in game development and production. It jumps to 20 percent for collaborations with an NC university or community college.

FOUR

NC State colleges involved in the university's proposed Digital Games Research Center, bringing different perspectives to game development.

"We engage with educational games the same way," Young said, "and so they have the same compelling learning potential as when you're playing a traditional game and learning how Mario jumps."

These serious games need skilled developers, and NC State faculty and students are filling those roles. Through a new game development concentration in computer science, which was recently ranked among the top 15 undergraduate video game

design and development programs in the US and Canada by the Princeton Review, students can tailor their academic careers around gaming courses. As seniors, they can participate in a game design showcase that puts computer science and design students on a team. The task: Build the best game possible.

Collaborations like these mean students from different disciplines get experience with the entire game development process, said Tim Buie, co-director of the DGRC and an assistant professor of design at NC State. That's attractive to employers.

"Both sides get to see what kind of world the other lives in, and when they do that it stops becoming this unknown, arcane thing. That's the magic that occurs here," Buie said. "The students understand that they are part of a bigger process where the team depends on you and you depend on your teammates."

Last year's showcase featured *Terraform*, a game that teaches chemistry by placing players in a world where they need to solve chemical puzzles to create habitable conditions for humans. The game was a student-division finalist at a large gaming conference in Florida last fall.

Another educational game, *Blackbeard's Escape*, is based upon gathering artifacts from the site in North Carolina's Beaufort Inlet where the pirate's ship famously ran aground in the 18th century. After the game was released in 2009, it was promoted heavily by the NC Dept. of Cultural Resources as a way for young people to learn about an important chapter in the state's history.

Armed with these gaming experiences, NC State graduates are making their marks in the industry. One of the *Terraform* developers, computer science graduate Josh Fairhurst, has founded a company, Mighty Rabbit Studios, that now operates in the Joystick Labs gaming incubator program in Durham. He's developed a game based on 1980s Saturday morning cartoons for mobile devices, and a PC version is under development.

He credits Young, one of his NC State professors, with giving him the skills to succeed.

"He throws you in and forces you to learn the programs," Fairhurst said, "which is really important because now I use those skills in my company."

But NC State does more than feed top talent to the industry. At the DGRC, housed in the Department of Computer Science, 15 researchers from four NC State colleges investigate the scientific, engineering, social and educational challenges of digital entertainment. The researchers collaborate on everything from the social impacts of mobile gaming to emerging 3D technologies to developing new ways to enhance learning through games.

The researchers are also trying to solve real-world problems. Young, along with other NC State colleagues, is developing a forensic science game called *IC-CRIME* that allows investigators to create virtual versions of a crime scene that can be analyzed long after investigators leave the area.

The work begins with a 3D scanner that logs fingerprints, hair samples and other evidence needed to solve the crime. Then detectives, prosecutors and others involved in the case, even if they're in different locations, can see the scene as the case works through the judicial system.

"They can discuss different theories for explaining how the crime scene gives clues as to what happened, even if the investigators are spread out across the world," Young said.

Another big push from NC State's serious games research efforts is in K-12 education. Attitudes towards games in the classroom have changed, and teachers have recognized that since students enjoy games so much outside school, they'll likely enjoy them in the classroom as well. Together with collaborators in NC State's College of Education and the Friday Institute for Educational Innovation, computer scientists are working to enhance learning through gaming.

"There's a recognition that students will spend their time on what's enjoyable," said Dr. James Lester, professor of computer science. "So if you create a learning environment that's engaging, then it's much more likely to hold their attention."

One game series developed by Lester's group, *Crystal Island*, has been used by more than 1,000 elementary- and middle-school students over the past several years. The games, derived from the North Carolina standard course of study, put players in an island setting where they have to navigate the landscape and solve problems or figure out what's causing an outbreak of disease.

Versions of the game are now being tested in Raleigh-area schools, including the Centennial Campus Middle School at NC State, and in schools in New Zealand and China. The games collect

data on the players' decisions as students make their way through the levels, allowing researchers to see how different types of students are processing the information.

"We would never want these technologies to replace the teacher," Lester said, "but instead they can act in this augmenting

capacity in which the teacher becomes more of an orchestrator of learning activities rather than a lecturer standing at the front of the room."

All these efforts draw a smile from O'Neill, the NC State alumnus whose company has produced 35 gaming and other applications over the past three years, including games for the iPhone, iPad and Nintendo Wii. The company has 10 full-time employees, and four of them are NC State graduates.

O'Neill hopes to hire more NC State graduates this year, efforts that will continue the Triangle gaming industry's growth. He knows those graduates will be qualified.

"Computers are fun, but it's not just about writing code," he said. "It's interpersonal communications, problem-solving, technical writing and other skills. I got those experiences at NC State, and I know they will too." ■

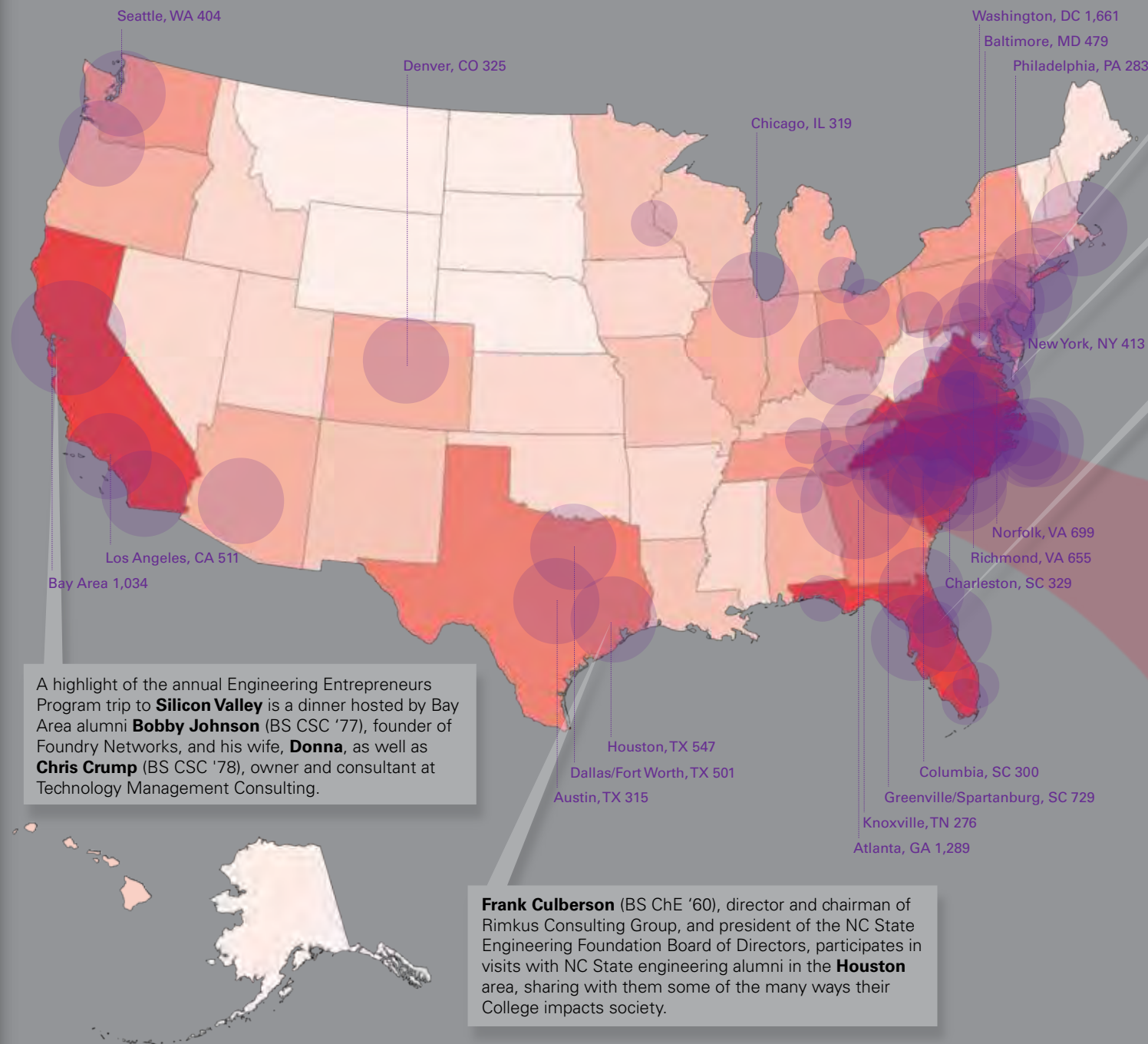
"[Educational games] have the same compelling learning potential as when you're playing a traditional game and learning how Mario jumps."



Dr. Michael Young (right) and Tim Buie lead NC State's Digital Games Research Center, which investigates the scientific, engineering, social and educational challenges of digital entertainment.

A NATION OF NC STATE ENGINEERS

In big cities, small towns and everywhere in between, NC State engineering and computer science alumni are leading the nation's efforts to solve the grand challenges facing our society. These maps show the states, large metro areas and North Carolina counties that nearly 50,000 living NC State engineering graduates call home.



Peter Lehrer (BS CE '63), chairman of Lehrer LLC, is making it possible for 13 civil, construction, and environmental engineering students to tour the 9/11 Memorial Preview Site and learn about the memorial and museum being built at the nearby World Trade Center site. Lehrer also helped arrange an event for the visiting students to interact with **New York**-area alumni.

Suzanne M. Beckstoffer (BS CE '82), director of technology development at Northrop Grumman Shipbuilding – Newport News, has set up meetings to foster research and recruiting activities between Northrop Grumman and civil, construction, and environmental engineering faculty and students. Faculty and students have enjoyed annual tours of the company's **Newport News** facilities.

Len Habas (BS EE '66), chairman and CEO of Advance Publishers, and his wife, **Gerry**, have graciously opened up their home to host dinners and events for **Orlando**-area alumni to meet Chancellor Woodson and Dean Martin-Vega.

A highlight of the annual Engineering Entrepreneurs Program trip to **Silicon Valley** is a dinner hosted by Bay Area alumni **Bobby Johnson** (BS CSC '77), founder of Foundry Networks, and his wife, **Donna**, as well as **Chris Crump** (BS CSC '78), owner and consultant at Technology Management Consulting.

Frank Culberson (BS ChE '60), director and chairman of Rimkus Consulting Group, and president of the NC State Engineering Foundation Board of Directors, participates in visits with NC State engineering alumni in the **Houston** area, sharing with them some of the many ways their College impacts society.

A scanning electron micrograph showing a dense array of vertical, cylindrical microposts. Each micropost is covered in a fine, textured coating of carbon. The background is dark and out of focus, highlighting the intricate structure of the microposts.

TINY MATERIALS

BIG AMBITIONS

NC State engineers play key roles in the
university's top-flight nanotechnology efforts

These tiny coated carbon microposts created by Dr. Anatoli Melechko in materials science and engineering and Dr. Gregory Parsons in chemical and biomolecular engineering could one day help in solar energy collection and utilization.

Dr. Veena Misra wants the laptop you buy five years from now to bear little resemblance to the one you have now. It should be many times faster, much more powerful and allow you to do things you've never dreamed of doing on your current machine.

Like dozens of other researchers at NC State, Misra is using nanotechnology — in which researchers manipulate the properties of the tiniest of materials — to make those advances happen.

"We want to demonstrate nanotechnology in a real device that can make a difference," said Misra, professor of electrical and computer engineering. "We can take nano fundamentals and apply them to real world applications."

Today you can find dozens of NC State engineers interacting with each other and with researchers across campus as part of the NC State Nanotechnology Initiative, a university-wide effort established in 2006. The initiative focuses on nanotechnology research, outreach and education and seeks to foster inter-disciplinary research and infrastructure; expand academic programs and educational impact in the field; and support nanotechnology-focused collaborations within the university and with local industry.

Nanotechnology focuses on the fabrication and manipulation of materials and devices with dimensions less than 100 nanometers; for perspective, the head of a pin is about 1 million nanometers wide. When these tiny materials and structures are altered and controlled, they exhibit unique properties not found in larger-scale systems. For example, aluminum, a normally stable material, becomes combustible on the "nanoscale." And copper, an opaque substance, becomes transparent.

Such changes can lead to the creation and improvement of devices, products and materials that we use every day. NC State engineers have

Nanotechnology in NC

Raleigh

Ranked among the top five “nano metro” clusters in 2009 by the Project on Emerging Nanotechnologies.

North Carolina

Recently broke into the top 10 states in the nation for the highest concentration of nanotechnology companies, universities, research laboratories and organizations.*

*2009 Project on Emerging Nanotechnologies study

The NC State Nanotechnology Initiative

Colleges Represented

- › Agriculture and Life Sciences
- › Education
- › Engineering
- › Humanities and Social Sciences
- › Management
- › Natural Resources
- › Physical and Mathematical Sciences
- › Textiles
- › Veterinary Medicine

Research Thrusts

- › Health and bio-nanotechnology
- › Nanoenergy and environment
- › Nanomaterials and engineering
- › Nanosafety and security
- › Social and education nanoscience

Graduate Fellowship Program

NC State has been awarded fellowship slots by the US Department of Education for its Nanoscale Electronic and Energy Materials program, which prepares students for research and teaching careers in the field.

NC State NanoDays

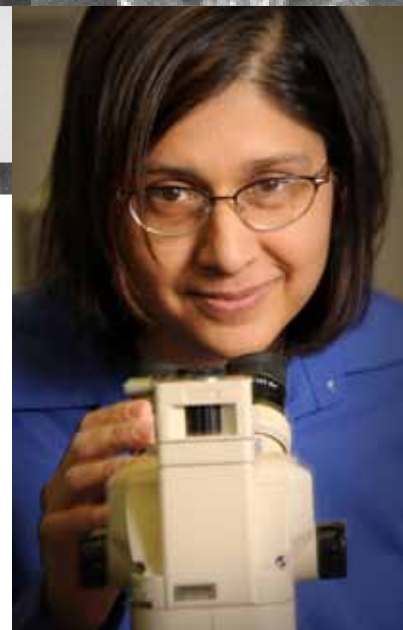
The event introduces nanoscience to K-12 students, educators and parents throughout the state. Nearly 2,000 people attended NanoDays 2010.

Recent Accomplishments

- › *Small Times* ranked NC State **3rd in commercialization, 10th in research** and **10th in peer nano commercialization** among US academic institutions in 2009.
- › NC State researchers received **25 nano- and micro-technology patents** in 2009-10.
- › The initiative offered assistance with more than **26 multi-disciplinary nano-technology proposals** across NC State in 2009-10.
- › The initiative led, sponsored or leveraged proposals that brought more than **\$10.8 million in research** funding to NC State through June 2010.

More information: www.ncsu.edu/nano

Dr. Veena Misra (right) conducts research on magnetic nanowires. These remarkably small structures could play a key role in creating faster electronics.



campus communicate about research that they're doing,” said Dr. Gregory Parsons, director of the initiative and Alcoa Professor of Chemical and Biomolecular Engineering.

Today, the initiative includes researchers from nine NC State colleges, including many from the College of Engineering. These engineers realize the importance of collaboration, especially regarding research proposals to funding agencies such as the National Science Foundation.

“In order to successfully get

funded these days, proposals must be cross-disciplinary in nature and bring together scientists from different disciplines in order to effectively address the challenges,” Misra said.

Among Misra's collaborative projects is an effort to use magnetic nanowires to decrease the power dissipation per chip, increase the number of transistors and improve the speed of electronic devices.

Silicon is the transistor material most frequently used in devices such as laptops, PCs and cell phones, but researchers appear to have hit a wall. Silicon is reaching its limit to be scaled down and is losing its ability to uphold Moore's Law, a technology rule of thumb holding that the number of transistors that can be squeezed into a computer chip doubles every 18 months. This pace of progress can't be sustained unless researchers work with new materials on the very small scale.

“We need alternative routes to continue the progress in electronic improvement, performance and power,” said Misra. “We don't know what that answer is going to be, but there are many approaches being pursued and several of us at NC State are pursuing several promising pathways.”

Others are also using the team approach. Dr. Nancy Monteiro-Riviere, professor of investigative dermatology and toxicology at

NC State, assesses the safety and health effects of nanomaterials in everything from sunscreens to medical devices. She is working with NC State industrial and systems engineers to try to determine whether silver-coated prosthetic devices will release ions to kill bacteria and eliminate infection — an existing problem among prosthetic implants.

Dr. Jon-Paul Maria, professor of materials science and engineering, is working with Dr. Michael Dickey, assistant professor of chemical and biomolecular engineering, to use nano-enhanced solar cells to develop automatic charging stations for soldiers' computers, night-vision displays and GPS devices. Instead of carrying additional batteries, soldiers can use the stations to recharge the batteries and decrease their loads.

More collaborations have come as a result of NC State nanotechnology forums, which are held regularly on campus. Researchers from across campus are invited to give short presentations on their current research. The forums help researchers learn what colleagues in related fields are doing.

For example, Parsons' collaboration with Dr. James Bonner, associate professor of toxicology at NC State, began shortly after he met Bonner at the first nanotechnology forum. Bonner was studying the potential health effects of nanotubes, which can be found in a variety of products including computer screens, heat-resistant cookware and prescription medication containers.

To learn more, Parsons suggested using his thin-film coating methods to change the surface structure of nanotubes and see if that might affect their toxicity level. The two researchers wrote a proposal and received funding from the National Institutes of Health. Today, they are one of the only groups in the country looking at how to modify nanotubes to affect and mitigate their toxicity, which could help make nanomanufacturing plants and resulting products safer.

Dr. Orlin Velev, INVISTA Professor in Chemical and Biomolecular Engineering, also attributes some of his recent research successes to the initiative.

“The initiative has helped us find a way to speak with each other and collaborate,” he said. “We want to know about each other's re-

search, establish contacts, discuss experimental capabilities and start collaborative projects.”

Velev recently led a team of researchers that showed how water-gel-based solar devices — “artificial leaves” — can function like solar cells to produce electricity. The findings proved the concept for making solar cells that more closely mimic nature. They also have the potential to be less expensive and more environmentally friendly than the current standard-bearer: silicon-based solar cells.

The work in Velev's group was funded through a grant from the US Department of Energy to investigate nanoscale processes for renewable energy. The grant project, developed and managed by the initiative, currently supports facilities and five research groups led by Velev, Dickey, Parsons, Misra and Dr. Christopher Gorman, professor of organic and materials chemistry.

“The discussions with our colleagues, the funding and the equipment have allowed us to finish our work and get published,” Velev said. “Cooperating with other people and using shared facilities helped our work a lot.”

NC State researchers see more opportunities for partnerships. Last year, they were awarded 25 nano- and micro-technology patents.

“Some of our own folks have gone on to create startup companies that create jobs,” Misra said. “I think it just goes to show how important it is to continue our nanotechnology efforts to help the economy of North Carolina. There are a lot of opportunities for entrepreneurship in this area, so we need to continue to build that.”

Parsons, who serves as co-chair of the research and scholarship division on Chancellor Randy Woodson's Strategic Planning Committee, hopes to see the Nanotechnology Initiative keep evolving positively as the new chancellor continues to roll out his vision for the university.

“I'm an alumnus, and I'm proud of what we're doing,” Parsons said. “Keep your eyes on NC State. We're not waiting around; we're pushing forward.” ■

Dawna Hawley (second from left) and other students helped install a solar thermal heating panel as part of an NC Solar Center training program.

Training for a CLEANER FUTURE

The North Carolina Solar Center, an arm of the College of Engineering, is training state residents for jobs in the burgeoning green economy.

When the husband-and-wife team of Dawna Hawley and Marc Desormeau opened Sundogs Solutions in early 2010, they wanted to be a one-stop-shop for homeowners looking to save energy.

Both had backgrounds in housing — Dawna as a real estate broker and Marc as a contractor, but they hoped to offer more than the standard weatherization services and energy audits. So they completed training programs at the NC Solar Center, and now Sundogs Solutions can install solar panels and consult on green building projects. And since the Solar Center is in the area — Sundogs Solutions serves the Triangle — they continue to network with instructors and fellow students.

“You’re meeting plumbing and electrician contacts,” Hawley said. “And the instructors are often local experts who are available for questions outside class if you’re stumped on something.”

Each year, the training programs offered at the Solar Center, part of the College of Engineering at NC State, teach hundreds of North Carolinians skills for the burgeoning green economy. Since 2004, about 1,000 electrical contractors, engineers, architects and other professionals have earned continuing education “diplomas” at the center through its Renewable Energy Technologies Diploma Series.

They’ve learned to install rooftop solar panels and home wind turbines, use building materials that save energy, and grow crops for biodiesel production. And thousands of other North

Getting green for going green

There’s lots of cash out there for residents and businesses that want to save energy. But where to find it?

Look no further than the Database of State Incentives for Renewables and Efficiency, an ongoing project of the NC Solar Center and the Interstate Renewable Energy Council. Known as DSIRE, the site is considered the nation’s premier source of information on state, local, utility and

federal incentives and policies that promote renewable energy and energy efficiency. The site gets more than 250,000 unique visitors per month.

A recent search for North Carolina, for example, turned up electricity discounts for Energy Star-certified homes, tax credits for companies developing green technologies and tax exemptions for homes with solar energy systems.

Check it out at www.dsireusa.org. ■

Carolinians have been touched by the center’s additional outreach and training programs in green building, clean transportation and clean energy.

This record of success helped the center recently land a \$2.3 million grant from the US Dept. of Energy to train up to 40 community college and high school instructors annually on solar technologies. The idea for the program is to tear down two primary barriers preventing widespread adoption of renewable energy systems: the lack of quality trainers who can teach others to properly install the systems and the absence of a proven, standardized training curricula so everybody is following the same installation rules.

“It’s up to us to make sure the quality control is where it needs to be,” said Steve Kalland, the Solar Center’s director.

Among the center’s goals, Kalland said, is to prevent the free-for-all approach to renewable energy of the 1970s, when generous tax credits, coupled with high gas prices, drew a flood of entrepreneurs into the market. But there wasn’t much oversight, and it seemed like everyone in the industry was doing some-

thing different. So when the tax credits dried up and gas prices fell during the following decade and many of those entrepreneurs went out of business, homeowners were left with poorly installed solar-energy systems and no one to fix them.

But over the past few years, the industry has recovered, and the Solar Center has worked to expand it in a controlled way. The renewable energy and energy efficiency industries supported about 12,500 jobs in North Carolina in 2010, up 22 percent from a year earlier, according to the NC Sustainable Energy Association.

“Until a year ago, many of these folks were conventional plumbers and electricians,” Kalland said. “And they’re looking at the slowdown in the housing and residential construction markets

and they’re saying, ‘What can I do to diversify? Renewable energy equipment is still selling, so maybe I should diversify into that.’”

Among the students at a November training session at the Solar Center was Terry Rademann, a trades instructor and licensed builder at Coastal Carolina Community College in Jacksonville, NC. The college is working to incorporate more green building into

Training at the NC Solar Center

Training areas

- » Photovoltaics (solar electricity)
- » Solar thermal heating
- » Wind energy
- » Biodiesel
- » Green building
- » Clean transportation
- » Clean energy applications

Credit hours offered in 2010

- » 2,260

More information www.ncsc.ncsu.edu

its curriculum, and Rademann had spent the past two years earning certificates from the center.

Rademann has years of experience with renewable energy materials, but the Solar Center diplomas provide a stamp of approval that he can advertise.

“This gives me legitimacy,” Rademann said. ■



DILIGENT SOPHOMORE GETS
A HEAD START ON AN INTERNSHIP

REGULAR RECRUITER SHOWS
UP EACH SPRING AND FALL

GRADUATING SENIOR LINES
UP FIRST JOB OFFER

Smart Career Move

ENGINEERING ALUMNUS LOOKS
TO HIRE MORE NC STATE GRADS

Thirteen years ago, NC State engineering students built the Engineering Career Fair from scratch. Today, the event is among the largest of its kind in the country.

They said it couldn't be done.

Round up nearly 60 companies and dozens of volunteers. Bring in hundreds of job-seeking students. Make sure there's plenty of food. Plan an entire day of activities at a large convention center.

In short, build a career fair from scratch.

But in early 1998, two NC State engineering students, Sasha Lanning and Neal

Guthrie, did just that. Along with a group of doggedly committed peers, they built a job fair that has grown into one of the largest events of its kind in the country.

"We had a lot of people tell us we were crazy," Guthrie recalled in an interview in December. "But looking back, it was a good thing to do and the right thing to do. And, somehow, it worked."

In the 13 years since, the Engineering Career Fair at NC State has blossomed into a bi-annual bonanza for job seekers looking for work in an engineering field. The fair has attracted as many as 340 employers ranging from tiny startups to Fortune 500 companies, along with lots of national laboratories and other government agencies. The Fall 2010 fair set an

The Engineering Career Fair: At a Glance

Founded: 1998

Attendance record: 4,784 (Fall 2010)
Cost: Free for job seekers

The next fair: October 4–5, 2011
The McKimmon Center, NC State University

More information:
www.engr.ncsu.edu/careerfair

attendance record; more than 4,700 job seekers showed up.

“I think it says something about the College of Engineering at NC State. The prestige of that institution is what keeps attracting recruiters there,” said Lanning, who today goes by Sasha Morris. “They know the Engineering Career Fair is where to go to get the best talent.”

And in today’s economic environment, when stubbornly high unemployment hinders the recovery from the recent recession, the event is more important than ever. Since the fair is open to everyone, not just students and alumni, it’s a way the College of Engineering helps boost economic growth for the state and nation.

“When companies go looking for top engineering talent, they come to this fair. It’s a story we’ve heard over and over again,” said Brian Koehler, director of international engagement for the College who helps run the event. “Even in extremely difficult economic times, as we just had, the Engineering Career Fair is here to serve the public.”

AT THE BEGINNING

But back in 1998, the notion that the Career Fair would amount to something so large and influential seemed far-fetched. The idea for holding the fair had been kicked around for years by members of the Engineers’ Council, the College’s student leadership organization, as a way to boost job prospects for students and raise money through selling booth space to employers for the College’s student groups.

But building a job fair had always seemed like an undertaking that was too

big to get off the ground. It wasn’t until Morris and Guthrie joined the council for the Fall 1997 semester that the idea really took off.

With only a few months to plan, there was much work to do. The first task was creating a list of companies. The students gathered contacts from academic departments, student societies, the NC State Engineering Foundation and the university’s career center. They sent letters to every company they could find.

“...the response from the hiring community was overwhelming, and the students were soon inundated with phone calls from employers eager to recruit NC State engineering students.”

“I can remember many late nights in Page Hall just sitting there folding, licking, addressing envelopes,” Guthrie said.

Much to their surprise, the response from the hiring community was overwhelming, and the students were soon inundated with phone calls from employers eager to recruit NC State engineering students. Guthrie had listed his apartment’s phone number on the letters, but since companies assumed he was an NC State staff member, they also assumed that Guthrie’s roommate was his office assistant when he picked up the phone.

“He still gives me a hard time about that,” Guthrie said, laughing.

With 58 employers pledging to show up, the students scrambled to line up space at NC State’s McKimmon Center, the only place on campus that could hold such a large event. They drew up a booth map for the employers and tirelessly promoted the fair to students.

On the night before the Feb. 11 event, the students arrived at McKimmon to monitor the last-minute preparations — only to be told that the room measurements on their booth maps were incorrect. Forced to create a brand new room layout, Guthrie found himself at the local Kinko’s at 3 a.m. making copies of the new plan.

On the big day, the event went surprisingly smoothly, the students remember. There were no major catastrophes, and about 1,500 students showed up looking for jobs and internships. Companies at that first fair included Andersen Consulting, AT&T, DuPont, IBM, Kimberly Clark, Lockheed Martin, Mitsubishi Semiconductor, Price Waterhouse and Sprint.

“I still tell people I have sleep disorders based on that semester we started the career fair,” Guthrie said. “I think a lot of people never thought we’d pull it off, and then they showed up and just said, ‘Wow!’”

DRIVING THE ECONOMY

As the fair has grown, it’s added more features, such as daylong shuttle bus service from outlying parking areas, that have kept employers and jobseekers coming back over and over again. The fair is still largely organized and run by NC State engineering students who help employers unload their cars, get students to the right booths and patrol the grounds with walkie-talkies looking for people to help.

Tomeka Thompson, a commercial leadership program associate for the large industrial gases company Praxair, was recruiting at the Fall 2010 fair and called the whole operation “well-orchestrated” and “seamless.”

“Everything is laid out very well from a logistical standpoint,” she said.

Previous career fairs have drawn students from other Triangle universities and from as far away as New York and Texas, and the event has also proven popular for job-seeking alumni and other visitors.

“I’ve been coming every semester since my freshman year,” said Chinyere Onuoha, a senior biomedical engineering major at NC State, as she made her way around the fall fair. “You can’t really replace meeting people. Building relationships takes time.”

The fair also provides something of a homecoming for many NC State alumni who return as recruiters for their companies. They include Dominique Bischof, who earned bachelor’s and master’s degrees in computer science and co-founded a company, TransLoc, shortly after his second NC State graduation. The 12-employee company provides real-time location monitoring of the NC State bus system and other transit organizations across the country.

Bischof said the career fair played an important role in TransLoc’s recruiting efforts. In fact, the company ended up finding one of its new employees at the Fall 2010 event.

“We’ve used other career services sites from other local universities,” he said, “but we’ve come to realize that this is the place.”

Eric Pearson, senior director of development programs for the aerospace and defense technology company Northrop Grumman, praised NC State for getting freshmen and sophomores out to the fair. Even though those students aren’t looking for full-time jobs, they see his company’s name and learn about it, which could bring them back as graduation approaches.

Still, he said, it’s important that the fair is open to all job seekers, a feature that provides a valuable service in tight economic times.

“In this type of economy, this really is helping everybody, not just NC State students,” he said.

A LOOK BACK

For Morris, who graduated with a degree in textile engineering, and Guthrie, a mechanical engineering graduate, starting the fair has been much more than a notch on their resumé. They credit the experience with helping them succeed in their fields.

Morris went on to graduate school and is now a software engineer at Parata Systems in Research Triangle Park. On the fair’s success, she said it’s “incredible to know that that legacy is still there.”

Guthrie is a section manager at BMW Manufacturing in South Carolina and often returns to the fair to recruit students. For a few years, he would even take vacation days and drive up to Raleigh, just to see how everything was going.

“You feel like it’s only getting better,” Guthrie said. “You never feel like it stagnates.” ■

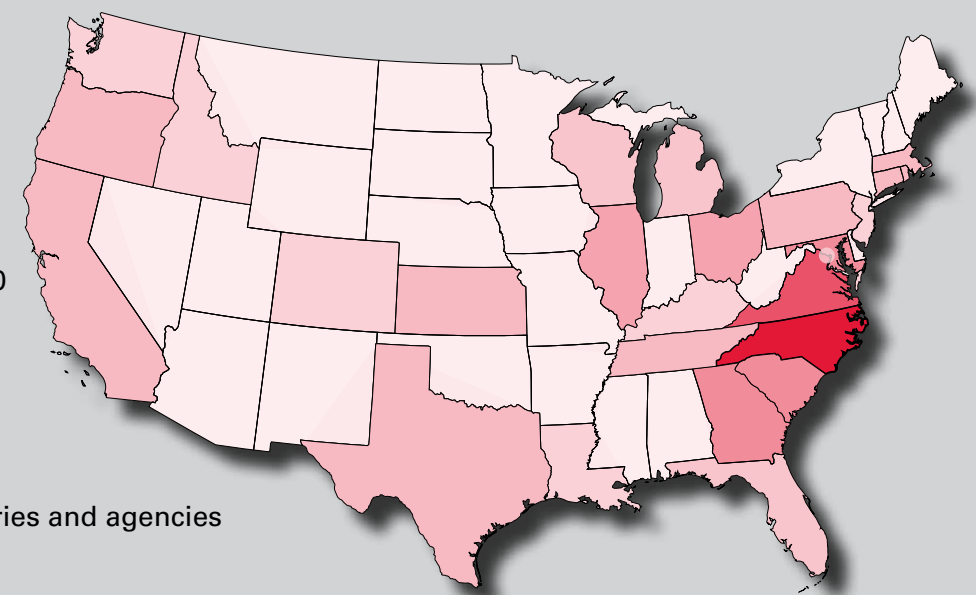
A National Draw

The Engineering Career Fair draws employers from all over the country to NC State. This map shows the geographic distribution of all 248 employers who attended the Fall 2010 fair, with darker states representing higher attendance volume.

26 states represented (plus DC)

44 Fortune 500 companies

37 Government/university laboratories and agencies



A POWERFUL PARTNERSHIP

ABB's gift to power engineering strengthens an already tight bond with NC State.



ABB executives Enrique Santacana, right, and Anders Sjoelin have continued to build the company's relationship with NC State.

It makes sense that NC State, a university with a top power engineering program, would work closely with ABB, one of the world's largest power grid suppliers.

And now that relationship has grown even stronger.

ABB, which has had facilities on NC State's Centennial Campus for two decades, announced in September plans to establish a smart grid research center at the campus. A few months later, the company's North American headquarters in Cary made a gift that helped to create a \$1.2 million initiative supporting power engineering research and education efforts in the Department of Electrical and Computer Engineering. The gift augments the more than \$300,000 the company is investing in NC State software, fellowships and power and power electronics research this year.

ABB, which is based in Switzerland, is also an industry partner of the FREEDM Systems Center, a National Science Foundation Engineering Research Center headquartered at NC State that is developing key technologies to reshape the nation's energy grid.

"Since becoming the first corporate tenants on Centennial Campus in 1991, ABB's regional power products and power systems divisions have made their homes on campus. It's a longstanding and welcome relationship," said Dr. Louis Martin-Vega, dean of the College of Engineering. "A prime motivation of ABB in North America is to establish a greater presence in the US. We are very pleased that this new endowment will help grow our research relationship and help ABB develop its domestic capability."

ABB is making the investments at NC State as society's demands for energy efficiency and reliable, high-volume power from clean energy sources have fueled tremendous growth in power engineering, which deals with the generation, transmission and distribution of electric power, as well as the electrical devices connected to

those systems. As more alternative-energy technologies enter the marketplace and the industry amps up energy efficiency and smart grid applications, researchers from universities and industry are working to reshape the power grid to handle the demand.

The recent \$1.2 million initiative includes a five-year commitment of \$632,000 from ABB plus anticipated matching grants. It will establish an endowed professorship, a faculty support fund, annual scholarships and a lecture series, all focused on power engineering.

The ABB Distinguished Professorship in Electrical Engineering will enable the College of Engineering to retain or recruit a top power engineering faculty member and support ground-breaking research in the field. In

addition to ABB's contribution, it is anticipated that the professorship will be supplemented by matching grants that NC State has requested from the UNC Distinguished Professors Endowment Trust Fund and the C.D. Spangler Foundation.

The ABB Power Engineering Scholarship program will offer five awards annually to students taking power engineering classes. The \$6,000 scholarships are roughly equal to in-state tuition and fees at NC State and will help attract talented students to the field.

The lecture series will feature prominent experts on topics related to recent developments in power technology and the smart grid. The gift also includes funds for faculty development in power engineering.

The ABB gift is important because engineering schools everywhere are investing heavily in their power engineering programs.

"It's a very competitive environment for attracting and keeping top faculty and students," said Dr. Daniel Stancil, head of the Department of Electrical and Computer Engineering. "This ability to offer professorships and scholarships will help bring the brightest minds in power engineering to NC State."

"It's a very competitive environment for attracting and keeping top faculty and students...this ability to offer professorships and scholarships will help bring the brightest minds in power engineering to NC State."

NC State students have long been attracted to ABB's power systems work. The company typically takes on five to eight interns from NC State each year and has hired three NC State PhD graduates as full-time employees over the past two years.

"One of our biggest challenges is finding skilled engineers who are well-trained in the technical principles of this dynamic field," said Enrique Santacana, president and CEO of ABB Inc. and region manager of ABB in North America. "Not only will this initiative establish a pipeline of talented people for ABB, it combines NC State's top academic thinking and our practical business know-how for advancing this exciting and rapidly changing industry."

ABB and NC State have a long-established relationship, and the company currently employs about 300 people on Centennial at a corporate research center and the North America headquarters of its power products and power systems divisions.

The company's Smart Grid Center of Excellence, which will open on Centennial this year, will employ about 50 people and include a testing

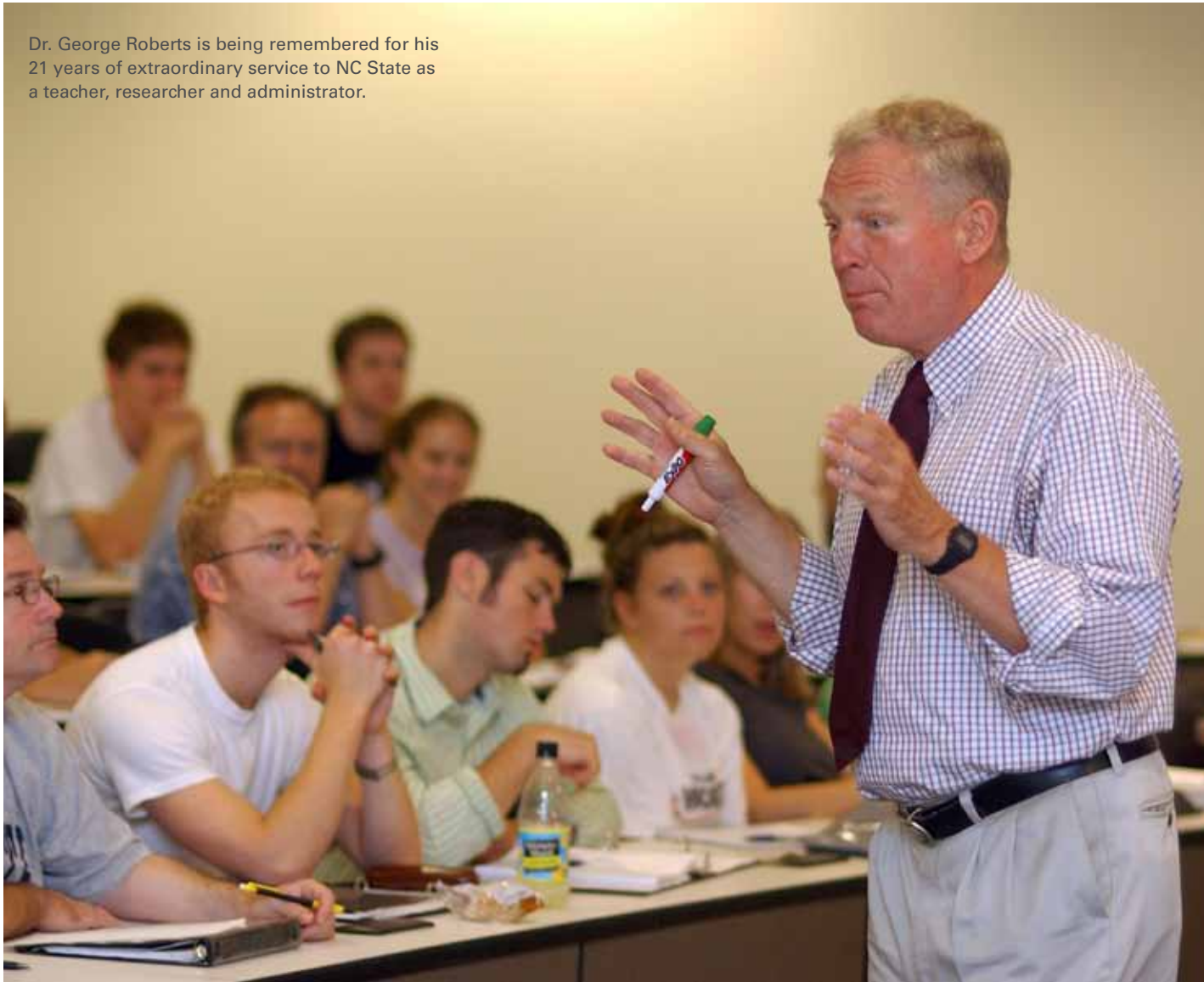
and development laboratory and a demonstration center that will showcase ABB's smart grid technologies and partnerships.

After the FREEDM Systems Center was announced in 2008, ABB became one of the center's formal industry partners and has worked closely with FREEDM researchers. The FREEDM Center's industry advisory board is chaired by Le Tang, vice president and head of the US corporate research center for ABB. Anders Sjoelin, region division manager for power systems with ABB, said ABB's smart grid work dovetailed well with FREEDM's research in the area.

"Locating our Smart Grid Center of Excellence in Raleigh will fuel even more collaboration with the FREEDM Systems Center," Sjoelin said. "FREEDM's focus on next-generation semiconductors and other smart grid technologies ties into our plans perfectly. We look forward to deepening our relationship with FREEDM." ■

Power and productivity
for a better world™





Dr. George Roberts is being remembered for his 21 years of extraordinary service to NC State as a teacher, researcher and administrator.

Remembering Dr. Roberts

NC State alumni, students, faculty and staff joined together with family and friends to celebrate the life of a much-loved professor.

Dr. Laura Beth Dong stood at the podium and composed herself. Facing an audience of more than 160 people, she recalled what Dr. George Roberts had sometimes written on her chemical engineering papers while she was his graduate student at NC State.

M-E-W-C. Make Every Word Count.

“I would not be the person that I am today without having met Dr. Roberts,” she told the audience, “and I am sure that many more of his lessons will reveal themselves to me over time.”

Dong made her remarks at a ceremony at NC State late last summer celebrating the life of Roberts, professor emeritus and department head emeritus of chemical and biomolecular

engineering. Roberts, who died in April 2010 at age 71 after a short illness, was remembered for his 21 years of extraordinary service to the department as a teacher, researcher and administrator. Several of his college classmates, colleagues and former students, as well as Roberts’ wife, Mary, spoke at the event.

Roberts was such a beloved figure that two memorial funds were established at NC State in his name. One fund will be used to award scholarships in chemical and biomolecular engineering. The other will support NC State’s American Institute of Chemical Engineers (AIChE) student chapter, for which Roberts served as chapter advisor for 10 years.

Together, the funds now total about \$96,000 due to an outpouring of support from family, friends, colleagues and former students who cared for and learned so much from Roberts.

“George was extremely loyal and very easy to work with because he was so direct,” said Dr. Ruben Carbonell, Frank Hawkins Kenan Distinguished Professor of Chemical Engineering at NC State. “And he really took the time to meet his students and get to know them personally, so they loved him.”

Roberts came to NC State as a department head in 1989 following a quarter-century of work in industry and academia at Rohm and Haas, Engelhard, Air Products and Chemicals, and Washington University. At NC State, his teaching and research interests included chemical reaction engineering, applied catalysis, polymer synthesis in high-pressure fluids, and the development and commercialization of new technology.

Roberts made important advances in these fields. He was a co-inventor on 19 US patents and the author of many publications, book chapters, and the successful textbook, *Chemical Reactions and Chemical Reactors*. He was awarded the NC State Alumni Association Outstanding Teacher Award, the Alcoa Foundation Distinguished Engineering Research Award, and many other honors.

During his five-year tenure as department head, his accomplishments included initiating a department newsletter to reach out and connect to alumni, creating an industrial advisory board to enhance corporate relations and obtaining some \$750,000 in grants

to support faculty development, graduate education and facilities improvement, as well as more than \$1.2 million in outside grants and contracts to support research on alternative fuels.

Friends, co-workers and former students remember Roberts as a great conversationalist who liked to tell jokes, enjoyed dancing and loved rock and roll. He was also a Civil War buff, and made the point of telling colleagues that the father of Daniel Harvey Hill Jr.,

the third president of NC State for whom the D.H. Hill Library was named, served as a Confederate general in the Civil War.

“He had an incredibly broad spectrum of interests,” said Peggy Wilkins, who worked with Roberts for many years at the NC State-UNC Kenan Center for the

“George was extremely loyal and very easy to work with because he was so direct. And he really took the time to meet his students and get to know them personally, so they loved him.”

Utilization of Carbon Dioxide in Manufacturing.

Roberts was a favorite among students. Under his leadership, the NC State AIChE student chapter won nine outstanding chapter awards, and he was named AIChE Outstanding Student Chapter Advisor in 1997. His colleagues admired his ability to recall all his students’ names, even those who had long since graduated.

Dong, now a senior process development engineer for Albemarle Corp., remembers Roberts dancing the night away during annual recruiting weekends for graduate students. It was that ability to have fun and relate to his students that brought so many of them back to NC State last August to say good-bye.

“It just showed how Dr. Roberts affected a wide variety of people,” Dong said. “He was extremely generous, and he touched many lives.” ■

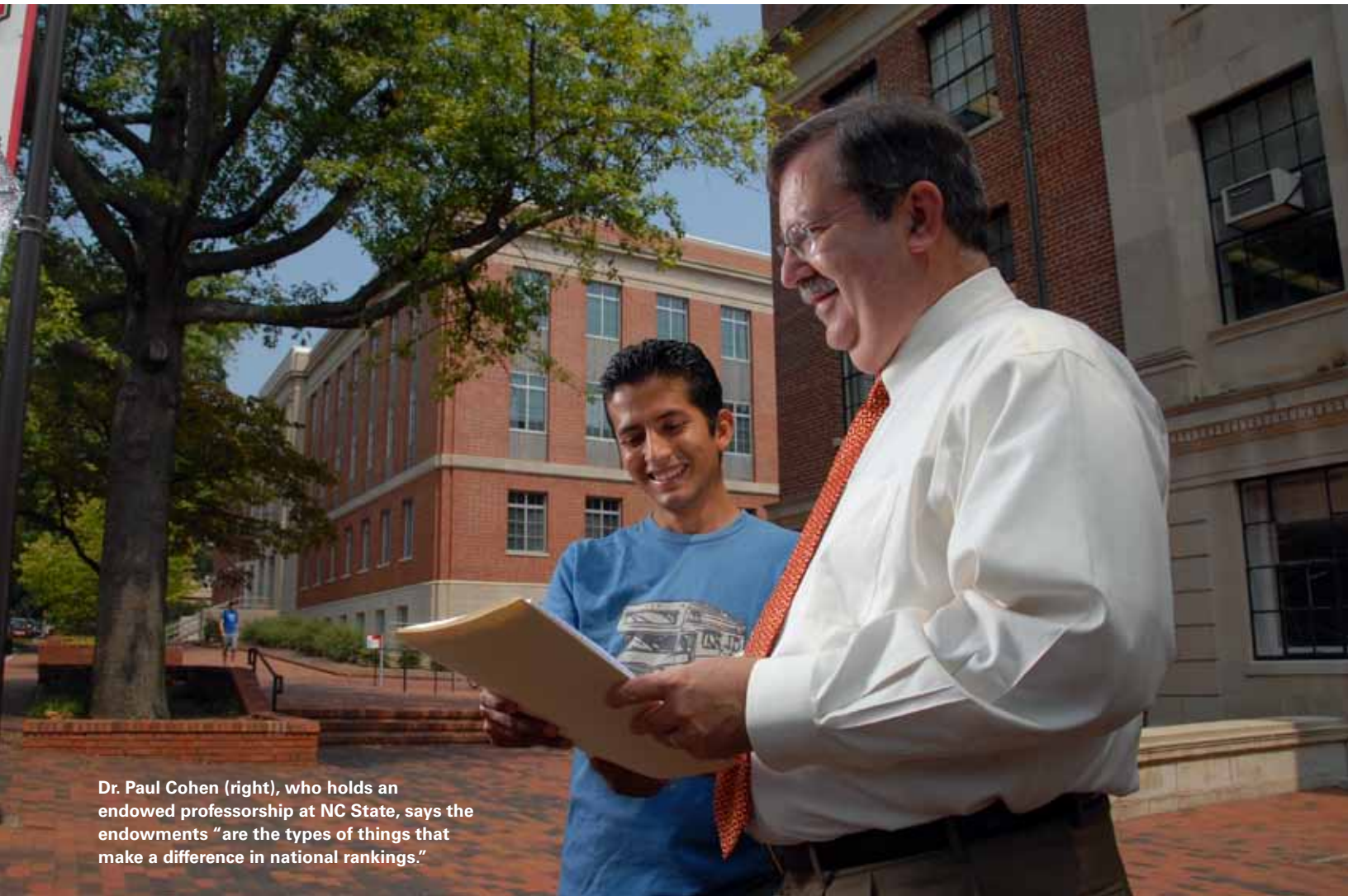
Opportunities to contribute

The George W. Roberts Memorial Scholarship will be used to award undergraduate scholarships to deserving students in chemical and biomolecular engineering.

The George W. Roberts Memorial Fund will support the NC State student chapter of the American Institute of Chemical Engineers (AIChE). Roberts served as its faculty advisor for 10 years.

For more information, please contact Dr. Russ O’Dell at the NC State Engineering Foundation at 919.513.2071 or russ_odell@ncsu.edu.





Dr. Paul Cohen (right), who holds an endowed professorship at NC State, says the endowments “are the types of things that make a difference in national rankings.”

Focus on Faculty

Bringing more top engineering professors to Raleigh is a priority of the NC State Engineering Foundation.

Part of Dr. Paul Cohen’s job is to recruit dynamic faculty members to NC State, and he understands that the ability to offer chaired professorships helps. A lot.

Cohen should know. He holds one of those professorships, and as head of the Edward P. Fitts Department of Industrial and Systems Engineering, he appreciates how important talented faculty are to the success of his department. That success includes the accomplishments of the many students who benefit from the knowledge and training that extraordinary faculty members can offer.

“Holding a chaired professorship allows you to do so many things,” said Cohen, the Edgar S. Woolard Distinguished Professor in Industrial and Systems Engineering. “Hire students. Buy a particular piece of software. Travel to an important conference. It allows you to do all those things and not worry about where the funds are going to come from.”

Securing funds for professorships has always been a priority for the NC State Engineering Foundation, which works with alumni, businesses and other partners to secure private financial support for the College. In fact, since 2006, 13 new distinguished professorships have been endowed in the College of Engineering. Of those, Foundation board members or companies they represent have provided private support for 11.

But the realities of the current era of shrinking appropriations from the state have ratcheted up the importance of private support. Competition for the most productive people puts endowed professorships at the top of the priority list. The College more than ever

Private gift + state match = Lasting impact

A state matching program for endowed professorships means donors who want top faculty at NC State get more for their money.

Private gift	State matching grant	Total endowed professorship
\$1.333 million	\$667,000	\$2 million
\$1 million	\$500,000	\$1.5 million
\$666,000	\$334,000	\$1 million
\$333,000	\$167,000	\$500,000

needs private donors to recognize the value of world-class researchers and educators.

“Nothing we do is more important than recruiting and retaining extraordinary people,” said Dr. Louis Martin-Vega, dean of the College of Engineering. “Endowed professorships allow us to attract faculty of great distinction to NC State, as well as provide recognition to our outstanding young faculty in such a way that they can feel that their careers will be very successful if they stay here.”

Professorship endowments create funds that are used for research activities — including graduate assistants and equipment purchases — course development and salary support. A state matching program tacks on an additional 50 percent to professorship gifts, providing another incentive for donors in an environment where NC State contends with other schools for the brightest engineering minds.

“Our competition is always in the marketplace looking for top faculty,” said Frank Culberson, president of the NC

State Engineering Foundation Board of Directors and a chemical engineering alumnus. “We have to do the same thing, and chaired professorships help us compete for the best of the best.”

Securing funds for more professorships is not the only goal on the foundation’s list. The board of directors wants to engage more with the College’s academic departments so members can more effectively spread the word about the College’s research and education efforts. Board members also want to further engage students and young alumni to inspire a lifetime of giving back. And they continue urging state leaders to complete the engineering build-out of Centennial Campus.

But professorships remain a priority. Cohen, who came to NC State from Penn State University, has seen the benefits of chaired professorships in his department, which has lured top senior faculty from other schools and kept award-winning younger faculty at NC State.

“These are the types of things that make a difference in national rankings,” Cohen said. “When you have outstanding people, the perception of the department and the college goes way up.” ■

Clark, Smith professorships awarded



Thanks to generous donors, the College was recently able to award distinguished professorships to two top faculty — Drs. Edward Jaselskis (left) and Mohammed Zikry (bottom-left).



Jaselskis was named the inaugural Jimmy D. Clark Distinguished Professor in Construction Engineering and Management. Jaselskis, who is coming to NC State from Iowa State University, is well known for his work in construction project success, innovative construction technologies and engineering public policy. His appointment is effective June 1.

The Clark professorship was established in 2007 by Jimmy D. Clark, a 1974 civil engineering alumnus. Clark, the owner and president of Guy M. Turner, Inc. in Greensboro, NC, is a member of the NC State Engineering Foundation Board of Directors and chairman of the university’s Board of Visitors.

Zikry was named the first Zan Prevost Smith Distinguished Professor in Mechanical Engineering. He has been an NC State faculty member since 1990 and is a leading expert in multiscale computational modeling of systems, fracture mechanics, crystalline plasticity and related areas.

The Smith professorship was established in 2005 by Carl M. Smith to benefit mechanical engineering and honor his son, Zan Prevost Smith, who received his bachelor’s, master’s and doctoral degrees from NC State in 1965, 1968 and 1977, respectively. ■

donor stories



S. James "Jim" Ellen Jr.

PROFESSORSHIP CREATED IN CCEE

The Department of Civil, Construction, and Environmental Engineering has a newly endowed faculty position, thanks to a gift from a generous NC State alumnus.

S. James "Jim" Ellen Jr., who graduated with a bachelor's degree in civil engineering with a construction option in 1959, made the \$333,000 gift to create the professorship. His gift will be supplemented by matching funds from the state's Distinguished Professors Endowment Trust Fund to create a \$500,000 distinguished professorship.

"I've reached a point where I can afford to give back, and NC State was a big part of my life and success," Ellen said.

Ellen is a Rocky Mount, NC, native who owns Capital Masonry, a commercial masonry contractor in Richmond, Va. His ties to NC State go back almost a century, he said, noting that an uncle graduated in the 1910s. His brothers Julius and William also received civil engineering-construction degrees from NC State.

Funds from the S. James Ellen Jr. Distinguished Professorship in Civil, Construction, and Environmental Engineering can be used to provide salary support for students or faculty working with the professor as well as professional development activities, research materials, travel and meal expenses and scholarly publications. ■



John and Rita Edmond

MSE GIFT TO BENEFIT GRADUATE STUDENTS

An alumnus and his wife have pledged a \$150,000 endowment gift to attract top graduate students to the Department of Materials Science and Engineering.

Dr. John A. Edmond, who earned his PhD in materials science and engineering at NC State in 1987, and his wife, Rita, established the endowment for graduate students studying electronic materials. The gift, to be made over five years, creates the Edmond Graduate Fellowship in Materials Science and Engineering.

John Edmond said the couple wanted to help top graduate students in the field succeed at NC State.

"We're doing it to help educate the students," he said, "because my education is a huge part of how I got to where I am."

Edmond is the co-founder and director of advanced optoelectronics at Cree, Inc., a leading light-emitting diode (LED) lighting company based in Durham, NC. Edmond and other NC State engineering alumni helped start the company in 1987. Today, Cree is a market leader in LED chips and components, LED lighting systems, power switching and wireless communication devices. ■

ECE RECEIVES NEW SCHOLARSHIP

An alumnus and his wife have established a \$50,000 scholarship endowment in the Department of Electrical and Computer Engineering to help attract promising students to the program.

The gift establishes the Robin and Susan Manning Scholarship in Electrical Engineering, which will be awarded to undergraduate students in the department's electrical engineering program. First preference for the need-based scholarships will be given to students from the Mannings' home county, Martin County.

Robin Manning graduated from NC State in 1978 with a bachelor's degree in electrical engineering. He is executive vice president of power system operations at the Tennessee Valley Authority and also serves on the NC State Engineering Foundation Board of Directors and chairs its college relations committee. Susan Manning is a lifelong educator who earned her bachelor's degree in education at UNC-Greensboro. ■



Robin Manning

GIFT BOOSTS eGAMES ENTREPRENEURSHIP EVENT

Two alumni have made a \$50,000 gift to NC State's eGames competition to help student entrepreneurs succeed.

The gift from Eric and Amy Huang means this year's event will be called the "Prometheus Group eGames — Sponsored by the Huang Family Foundation." The Huangs are co-founders of Prometheus Group, a Raleigh-based provider of customized industrial systems software packages and services.

The annual competition features teams of student entrepreneurs vying for cash awards as they create new venture business plans, website makeovers, sustainability action plans, and designs and prototypes of new products.

Eric Huang, who received bachelor's degrees in chemical engineering, chemistry and biochemistry from NC State in 1994, is Prometheus Group's co-chief executive officer. Amy Huang, who also graduated in 1994 with a bachelor's degree in zoology, is chief counsel and strategic advisor. ■



Amy and Eric Huang

CCEE GIFT TO BENEFIT FACULTY, STUDENTS

An engineering alumnus and his wife have made a gift to benefit faculty and students in the Department of Civil, Construction, and Environmental Engineering.

The gift establishes the Peter and Eileen Lehrer CCEE Enhancement Fund, which will provide funds for faculty development and undergraduate student enhancement, such as travel to academic conferences.

Peter Lehrer graduated from NC State in 1963 with a bachelor's degree in civil engineering. In 1979 he co-founded Lehrer McGovern, which grew to be among the largest firms in the American construction industry by managing major projects such as the Statue of Liberty and Ellis Island restorations. Since 1996, he has been head of Lehrer LLC, which provides construction consulting services for major development projects including Columbia University's Manhattanville campus.

Lehrer is also a member of the board of directors of the National September 11 Memorial and Museum. ■



Peter Lehrer

NC STATE ENGINEERING FOUNDATION, INC.

BOARD OF DIRECTORS 2010–11

S. Frank Culberson, President, CHE '60
Ashley S. Barnes, IE '95
Ashok Bhatnagar, NE '79
Larry A. Bowman, IE '73
Jimmy D. Clark, CE '74
Otis A. Crowder, CE '70
Christopher M. Crump, CSC '78
William H. Dean, EE '88
E.O. Ferrell III, EE '66
Edward P. Fitts, IE '61
Jeffrey R. Garwood, CHE '84
Donnie L. Goins, EE '85
Suzanne S. Gordon, CSC, MA '75, ST '80
Carlos D. Gutierrez, CHE '60
Len Habas, EE '66
James A. Hackney III, ME '61, IE '62
Ross W. Lampe Jr., IE '77
Robin E. Manning, EE '78
Lee Thomas Mazzocchi, CE '90
Thomas R. McPherson Jr., EE '76, '77
Thomas D. Pearson, FMM '65
V. Nelson Peeler Jr., EE '88
J. Stuart Phoenix, ESM '76
Timothy E. Scronce, IE '87
Willy E. Stewart, CE '81, '84
C. Richard Vaughn, NE '61
S. Edward White, EO '78
Charles T. Wilson Jr., CE '65
Scot Wingo, CPE '92
H. E. "Tony" Withers III, CE '75, DES '77
Jim Yocum, ME '84

STAFF

Ben H. Hughes

Executive Director of Development
and College Relations

Martin A. Baucom

Associate Executive Director of Development
Director of Corporate and Foundation Relations

Jason A. Bouck

Director of Development, Electrical and Computer
Engineering; Director of Dean's Circle

Lora F. Bremer

Director of Development, Civil, Construction, and
Environmental Engineering

Dr. Francis P. "Russ" O'Dell

Director of Development, Chemical and
Biomolecular Engineering

Daniel A. Pietrzak

Director of Development, Mechanical and
Aerospace Engineering; Associate Director of
Corporate and Foundation Relations

Lori Richards

Director of Development, Industrial and Systems
Engineering

Ken Tate

Director of Development and External Relations,
Computer Science

Gwen H. Bell

Manager, Business and Operations

Heather L. King

Accounting/Administrative Assistant

Dee Dee Stevens

Administrative Assistant to the Director

College celebrates distinguished alumni



Carlos D. Gutierrez



Ross Lampe



Ed White

The College of Engineering named Carlos D. Gutierrez, president and CEO of United Resource Recovery Corporation (URRC); Dr. Ross W. Lampe Jr., president of SMD Software, Inc.; and Stuart Edward White, chairman of the board of Field2Base, Inc. as its Distinguished Engineering Alumnus award winners for 2010.

The awards were presented by Dr. Louis A. Martin-Vega, dean of the College, at a banquet held Jan. 27 at the Park Alumni Center on Centennial Campus. The award honors alumni whose accomplishments further their field and reflect favorably on the university. All three winners are members of the NC State Engineering Foundation Board of Directors.

Gutierrez graduated from NC State in 1960 with a bachelor's degree in chemical engineering. In 1992, he founded URRC to refine silver and recover PET from X-ray films, and since 1996 he has guided the recycling of PET in the bottle-to-bottle program. In 2008 URRC formed a joint venture with the Coca-Cola Company to build the largest bottle-to-bottle recycling plant in the world; the plant has an annual capacity of 100 million pounds. Gutierrez has been a generous supporter of NC State and created, with his wife, the Carlos D. and Barbara Hoyle Gutierrez Endowed Scholarship.

Lampe received his bachelor's degree in industrial engineering from NC State in 1977. In 1998, he started SMD Software, Inc., which has become a successful software business serving the commercial real estate industry. Lampe and his wife, Ming-Mei, have continued the Lampe family's tradition of philanthropy to NC State, supporting the J. Harold Lampe Engineering Excellence Fund and creating, with Ross Lampe's father and brothers, the Ross W. Lampe Family Distinguished Professorship in Electrical and Computer Engineering. Their most recent gift established a distinguished professorship in the Joint NC State-UNC Department of Biomedical Engineering.

White earned his bachelor's degree in engineering operations from NC State in 1978. He leads the board of directors of Field2Base, Inc., a technology company that uses tablet PCs, wireless communications and Field2Base software to support the mobile work force for a variety of industries. He is also the founder of White Ventures LLC, a private equity and commercial real estate development company. White has been an outspoken ambassador for NC State and created, with his wife, Kathy, a Charitable Remainder Trust that will provide funding for professorships, fellowships, scholarships and programmatic support for the dean. ■

BY THE NUMBERS

A look at some of the figures that shape the College of Engineering



196

Students in the National Science Foundation Research Experiences for Undergraduates awards program from 2006 to 2010, more than double the previous four years.

4

Presidential Awards for Excellence in Science, Mathematics and Engineering Mentoring earned by College faculty and programs.

2012

Scheduled opening of the James B. Hunt Jr. Library, giving engineering students a state-of-the-art library on Centennial Campus.

6

NC State's rank among public universities for best overall value in *US News & World Report*.

295

New invention disclosures filed by College researchers from 2006 to 2010.

North Carolina State University
College of Engineering
Campus Box 7901
Raleigh, NC 27695-7901

NON-PROFIT
ORGANIZATION
U.S. POSTAGE PAID
RALEIGH, NC
PERMIT NO. 2353

PLANNED GIVING

Planning for the future through a will or trust can help you care for loved ones, manage your own care or even make a lasting gift to charity.

If you would like to include the College of Engineering in your long-term financial planning, here are some ideas to help you achieve your goals.

BEQUEST

Make a gift to the NC State Engineering Foundation and receive an estate tax deduction.

CHARITABLE GIFT ANNUITY

Make a gift to provide fixed income for a loved one.

CHARITABLE REMAINDER TRUST

Create life income for you and your spouse.

CHARITABLE LEAD TRUST

Pass property and other assets on to your family and support our mission.

Please call Martin Baucom at 919.515.7458 to discuss any of these charitable options or visit www.engr.ncsu.edu/foundation for more information.

nc state
ENGINEERING FOUNDATION