THE FLORIDA

ENGINEER

SPRING 2009

VOLUME 94

GROWING PAINS

179 BILLION ways engineering will revitalize our decaying economy

UF | UNIVERSITY of FLORIDA

THE FLORIDA ENGINEER
November 1951

WHAT MAKES OTTO WORK
Visitors to the University of Florida campus are occasionally startled by a huge, shiny, "freshman" speaking to them. A second look shows that they are being greeted by "Otto Mattix," the electronic robot who serves as mascot of the College of Engineering. Otto performs at various events and often helps with ticket sakes and charity drives on campus. Standing 6 feet tall, the robot wears a large orange "F" on his blue aluminum "sweater" and sports a jaunty rat-cap. Operated through remote-control by a carefully concealed operator, Otto puzzles and amuses his audience as he goes through an extensive repertoire of actions and carries on spirited conversations with visitors.

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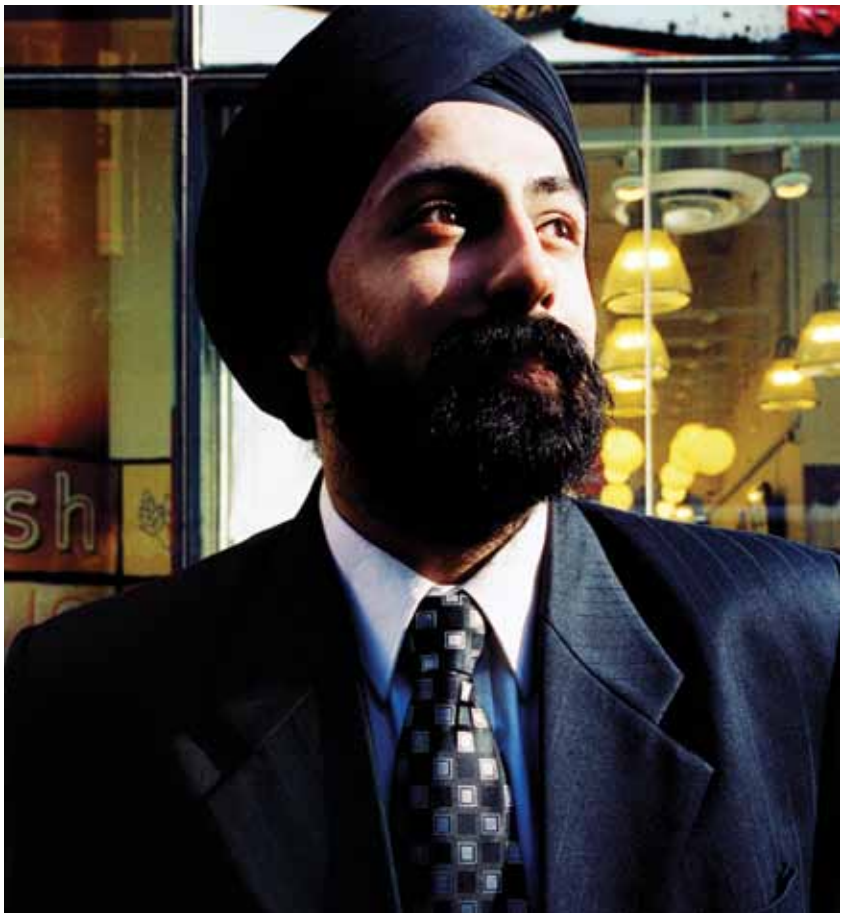
FEATURES



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TRUTH TELLING Tarundeep S. Batra (M.S. CISE '07) takes us on a personal tour of what it's like being an international engineering student trying to fit into a fragile post-9/11 world while keeping true to his beliefs. This is the first Gator Engineering face featured in "Truth Be Told."

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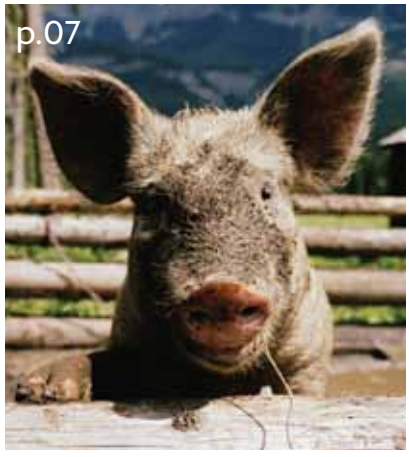

p.07

GET ENGAGED Pig waste, Uncle Fester, an orange-and-blue bus, land mines, drug trafficking, war-zone iPods, Tim Tebow, vats of used frying oil and a $50,000 office ornament are just some of the things you'll learn about in the Engage section.

CLOCKWISE FROM ABOVE: GABRIELLE REVERE; ANDERSEN ROSS; TIM HUSSIN

DEPARTMENTS

CONTRIBUTORS

WAYNE GARCIA is a UF graduate and an award-winning journalist, working in Florida newspapers and campaigns for 25 years. He is political editor for the Creative Loafing alternative-weekly newspaper in Tampa, where he writes a column and blog, The Political Whore (www.cltampa.com).

DEBORAH SWERDLOW is a junior majoring in journalism and Middle Eastern languages and cultures at UF. She hopes to work for Teach for America or the Peace Corps after graduation and then enter a career in newspaper editing. Her interests include following politics, traveling and singing.

DOUG McINNIS was an investigative reporter and part-time freelance writer before he left newspapers for a full-time freelance career in 1994. From his mile-high home in Wyoming, he's written for The New York Times and numerous magazines, including Popular Science, Astronomy and New Scientist.

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The Florida Engineer is published by the University of Florida College of Engineering, keeping alumni, students and friends of the College connected with Gator Engineering by reporting on issues relevant and timely to the field of engineering and the University.

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The Florida Engineer is a member of The Florida Magazine Association and CASE, the Council for Advancement and Support of Education.

from 300 Weil Hall

By many measures, our economy is in the deepest recession since the Great Depression. Globalization and the increased interconnectedness of the world economy have led to the rapid spread of the financial and economic problems to the rest of the world and in turn are affecting us. Global climate change and environmental damage; energy; water, food and natural resources; cost-effective health care; equitable access to high-quality education; terrorism and homeland security; and transportation and infrastructure are just some of the most pressing problems we need to solve. It will take truly extraordinary effort for us to face these challenges and create a bright future for our children.

More than ever, I firmly believe engineers have a very important, indeed absolutely critical, role in overcoming these challenges. We have the knowledge and the tools to provide leadership and support for the various initiatives that will surely be launched as we begin to remake our world in the aftermath of the worst economic crisis since the Great Depression. All our technical disciplines squarely address one or more of these challenges. We can also collaborate with people from other disciplines to form multidisciplinary teams to create novel and effective solutions. Our relevance is compelling and clear — what remains to be seen is how strongly we will engage these challenges and shape the solutions.

> "We have the knowledge and the tools to provide leadership and support for the various initiatives that will surely be launched as we begin to remake our world in the aftermath of the worst economic crisis since the Great Depression."

As an immigrant citizen of our country, I am optimistic about our future. Our entrepreneurial spirit, a world-class education system, and our open attitude toward new ideas are the great pillars of strength of the American society. President Obama, son of an immigrant, is beginning to engage with the many serious problems mentioned above. Working together, we can certainly conquer these challenges.

In this issue of The Florida Engineer, you will read about the work being done by our faculty, students, staff and alumni that shows the promise and relevance of engineering to make a better world. We depend on the support of our friends — readers like you — to continue to fulfill our mission and aspire to our vision of being a world-class College of Engineering deeply engaged in education, research and outreach for the benefit of the state of Florida, the nation and the world.

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IT'S A NEW DAY
In 2007, renewable energy accounted for more than 35 percent of all new capacity installations in the U.S. — a large contrast from 2004 when all renewable energy captured only 2 percent of new capacity additions. — D.O.E.

LESTER LEFKOWITZ

ENgAGE

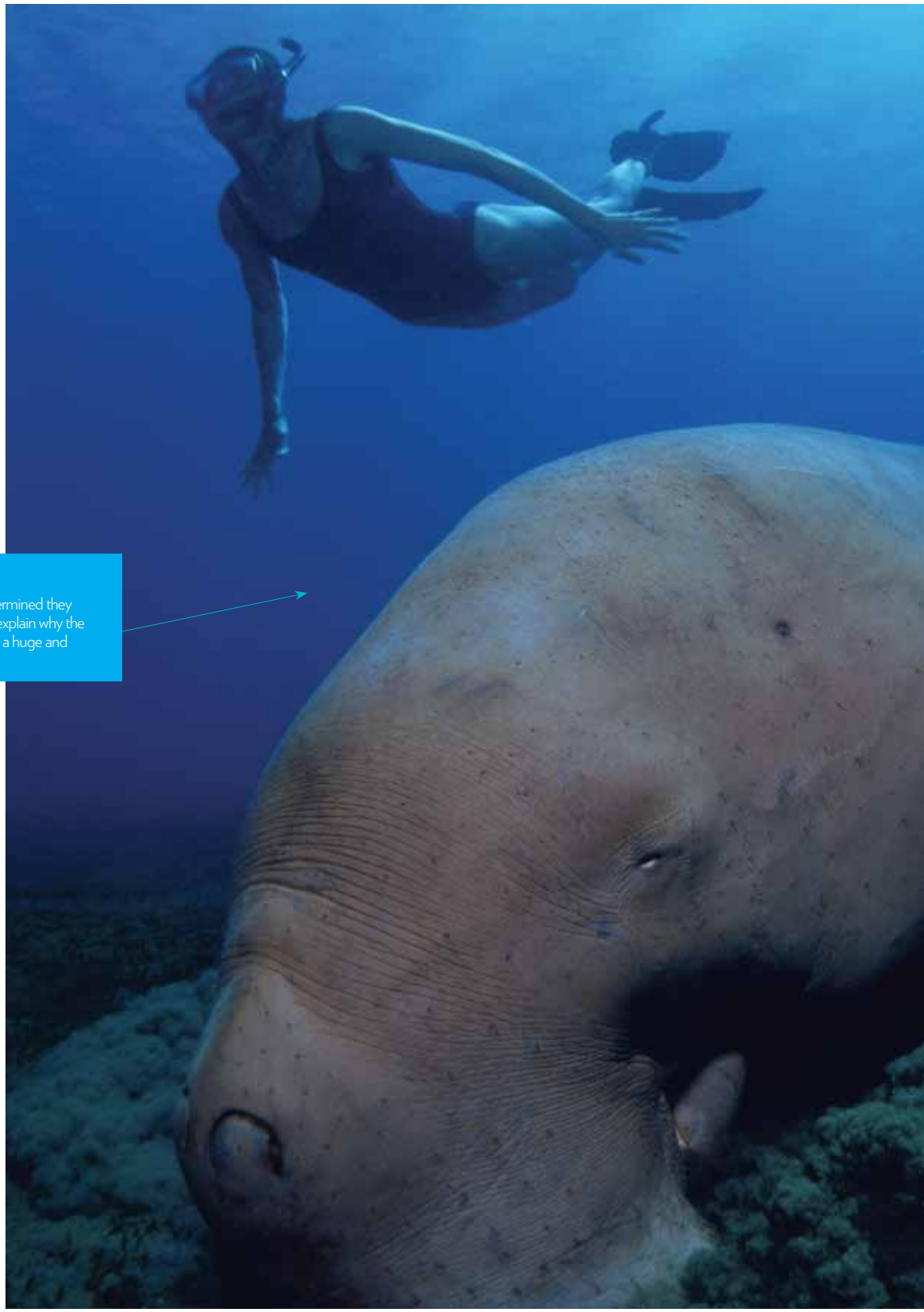
THINGS TO KNOW

Hybrids before they were cool
Mechanical Engineering professor Vernon Roan and students traveled to Detroit in 1972 to compete in a gas-electric hybrid vehicle competition at GM's proving grounds. The team's modified Datsun 510 won first place in the international competition.

And on the front
During World War II, UF engineering faculty contributed to the development of the VT radio proximity fuze for mortars. The miniaturized fuze allowed the weapons to detonate near their targets rather than upon contact.

Inflation 101
Tuition to attend UF in fall 1910, the year the engineering college was founded, was $120 per year — including room and board. Tuition in fall 2008 was $3,790, with the total cost including living expenses estimated at $15,740 annually. But we're still a bargain; UF has the lowest tuition in the nation among flagship institutions.

Saving the sea cow
Tests of manatee bones by UF materials engineers determined they were as fragile as some porcelain plates. The tests help explain why the threatened sea cows are so vulnerable to boat collisions, a huge and controversial issue in Florida.



Where would we be without those napkins?
John Vincent Atanasoff (B.S. EE '25) said he had a brilliant idea en route to Ames, Iowa, where he was a professor at Iowa State College. He went to a bar, sketched it out on a napkin, and soon invented the first electronic digital computer, the Atanasoff-Berry Computer.

Toward pristine playgrounds
Gator Engineers uncovered evidence that pressure-treated lumber used in playground equipment, porches and other structures leaches the deadly poison arsenic into the soil. As a result, the wood-preserving industry has voluntarily phased out treating formulas that use arsenic in all wood for residential construction.

Speeding the healing process
The FDA cleared a new wound dressing developed in part by UF engineering professor Chris Batich. Unlike current products, the dressing retains its microbe-fighting properties without allowing bacteria or toxins to migrate back into the wound. The result: nurses don't have to change dressings as frequently, which allows wounds or burns to heal more quickly.

The outlines of a tragedy
UF engineers were part of a team that made extremely precise maps of the World Trade Center area following the 9/11 attacks. The team used airborne laser swath mapping, or ALSM, which was new to the scene in 2001. UF, now home to the National Science Foundation-supported National Center for Airborne Laser Mapping, was the first university in the nation to buy and operate an ALSM unit.

IN THE NEWS | 12.08

GOING WIRE*LESS*

If only the lovable, sociopathic Uncle Fester Addams had this cool device, he never would have had to lip-lock that light bulb. BY AARON HOOVER

With a seemingly simple — but brilliantly innovative — wireless transmission, cell phones and other small electronic devices can now be charged by merely resting on a pad, thanks to an invention born at the College and just months away from the market.

The WiPower charge pad transmits power to devices placed upon it, making the need for cords obsolete. The technology began as a senior design project for Ryan Tseng, founder and CEO of UF spinoff WiPower. Tseng worked with UF Electrical & Computer Engineering professor Jenshan Lin on the project. WiPower, established in 2006, later sponsored continued research in Lin's lab to improve the technology, with the Florida High Tech Corridor contributing matching funds. "Hopefully in the future we can create something like Wi-Fi," Lin said, "except it becomes wireless power." WiPower, which has offices in Gainesville and Altamonte Springs, made an impression at the 2009 Consumer Electronics Show in Las Vegas and caught the eye of Paul Hochman, editor of Today Tech and a contributor to Fast Company magazine. Ann Curry, Today news anchor, demonstrated the WiPower pad live on Today, showing how adapter-equipped light bulbs illuminate without any cords when near the pad. □

CORD SPAGHETTI
Cell phones, iPods, cameras and BlackBerrys, no matter how technologically superior they are, share a common Achilles' heel: power cords. Enter the WiPower charge pad invented by Gator Engineers, which makes charging a cordless operation.

ENgAGE

6 THINGS YOU DIDN'T KNOW ABOUT UF ENGINEERING STUDENTS

BY DEBORAH SWERDLOW

TASTY! Garrett Redfield collects used frying oil from Broward Dining Hall.

ONE

Frying Oil May Not Be So Bad After All

Mechanical & Aerospace Engineering senior Eric Layton starts every day in a suit and tie — and ends it working with gallons of used frying oil.

As student volunteer coordinator for UF's biodiesel fuel lab, Layton helps oversee an operation that started with him and one graduate student in May and has grown into a 40-member lab producing about 750 gallons of B-100 biodiesel fuel a week.

To do this, the volunteers collect about 500 gallons of used frying oil a week from the Reitz Union, Gator Dining and other on-campus restaurants.

The used oil finds its way back on campus because the UF Physical Plant Department fills almost half of its trucks with a fuel mixture that consists of 20 percent biodiesel fuel and 80 percent regular diesel. Layton said the lab hopes to expand production to fuel all of the University's diesel vehicles.

Layton's team of volunteers, who hail from all engineering departments, the business college, and other areas of the University, are currently looking for off-campus sources of used frying oil and eventually hope to sell the biodiesel fuel commercially — something a university has never done before, Layton said.

> "I wanted to do something that would help change the world, and I felt that working on alternative energy and fuel cells would be a way to do that."

TWO

The Future Of Cars

It will probably be at least 15 years before the economy is ready for a car powered by a hydrogen fuel cell. But when that time comes, UF Materials Science & Engineering senior Matt Barnett will be ready.

Barnett is working with professor Eric Wachsman on building a 3-inch-by-3-inch fuel cell that can run on different types of renewable energy, including hydrogen and natural gas.

This size fuel cell is an advancement from the smaller "button cell," which was about 1 inch in diameter, Barnett said. The larger cell will be better suited for testing and implementation.

Specifically, Barnett is trying to figure out the best and most efficient way to coat these larger fuel cells. With the button cells, it was possible to brush paint the LSCF (lanthanum strontium copper ferrous oxide) coating, but now that the cell is larger, that method is too time-consuming.

PREVIOUS SPREAD FROM LEFT: TOBIAS BERNHARD/ZEFA/CORBIS; TIM HUSSIN; THIS PAGE: JASON HENRY

In essence, he's looking for a way to "spray coat" the fuel cells. This involves determining the optimal firing temperature and thickness of the coating.

"I wanted to do something that would help change the world," he said, "and I felt that working on alternative energy and fuel cells would be a way to do that."

THREE

Is It Hot In Here, Or Is It Just Me?

On the other side of the world, teams of workers trek into the swamps of Africa every 30 minutes to measure the temperature around mosquito ponds. It's cumbersome, but that's what it takes to try to predict the hatching of mosquito larvae, which can foreshadow a malaria outbreak.

Four Gator Engineering undergraduates working under Computer Engineering professor William Eisenstadt are determined to find an easier way to monitor these ominous temperature changes.

TROPICAL DEATH This isn't a new HBO series, it's malaria — and there are 350 million to 500 million cases each year, killing more than 1 million people, mostly children in sub-Saharan Africa.

Roger Liang, an electrical engineering senior who focuses on the software component of the program, said he and the rest of the team spent the summer building 10 wireless temperature sensors. The modules send a signal to the main computer, which uses the software he updated to synthesize all the temperature readings. Liang said the software can handle signals from up to 65,000 different temperature sensors. When the software was originally developed, it could only process up to 256 sensors, he said.

To conserve battery life, the current software can also function about 100 feet away from the temperature sensor, but Liang said it could eventually process a signal from a distance of a mile and a half.

In addition to using this research to prevent devastating malaria outbreaks, another practical application is monitoring the temperature of food during shipment to ensure safety and freshness.

FOUR

There's No Place Like Cambodia

When other students head back to mom and dad's house at the end of the spring semester, UF engineering graduate student Jennifer Apell and up to four other students will set off for Cambodia to study, of all things, pig waste.

Apell, a first-year environmental engineering graduate student, is leading a team of UF students on an assessment trip to Cambodia as part of a project with UF's chapter of Engineers Without Borders, a national organization devoted to implementing sustainable engineering projects in developing countries.

To combat rampant deforestation in Cambodia and health issues created by using wood-burning stoves in close

SAVE A TREE, USE A PIG Gator Engineering students are working with Cambodian officials to create a system to turn pig waste into biogas to power stoves. Wood-burning stoves are currently the norm in Cambodia, but that kills a lot of trees and causes pollution.

TOP RIGHT: ISTOCKPHOTO; BOTTOM RIGHT: ANDERSEN ROSS

quarters, the UF team plans to convert pig waste into usable biogas to power stoves. UF's student team will also look at new stove designs. It plans to work with Sustainable Cambodia, a Gainesville-based nonprofit organization, on both initiatives.

The students will make their first of several trips to Cambodia in late April or early May to assess the materials available on site and meet with village leaders to tailor the engineering projects to the country's needs. After the engineering students tweak their existing designs as needed, they will visit the country again to implement the new technology.

FIVE

Helping Tebow Throw

Even Superman needs help sometimes.

When Tim Tebow's shoulder was hurting after the 2006 football national championship, he worked with UF orthopaedic surgeons and engineers from the Biomechanics and Motion Analysis Lab to figure out what was causing the pain and how to fix it. The lab is housed in the UF Department of Orthopaedics and Rehabilitation, and it brings together physical therapists, UF engineers and other professionals.

Bryan Conrad, a Ph.D. student in the Pruitt Family Department of Biomedical Engineering and a senior engineer at the lab, placed about two dozen round markers on key joints of Tebow's body. Then he turned on the 14 high-speed cameras around the room, which picked up on the reflective tape covering the markers and created a 3-D computer model of Tebow's body for further analysis.

Each time Tebow threw the ball in the lab, the computer recorded the motion of his joints and calculated how much force he was applying to his hips and knees. The group used the information to suggest ways Tebow could adjust his throwing mechanics.

Judging by Tebow's record-setting season in 2007, it looks like they're on to something. They're hoping to consolidate all of their results into the "Florida quarterback model," which could help all college football players achieve ideal throwing mechanics.

"Never in a million years would I have dreamed that going into engineering, I would've gotten a chance to work with football players," Conrad said. "But it's funny how things work out."

SIX

Got Water?

UF civil engineering students Sabrina Parra and Stacey Smich are working on a solution to water crises all over the world — right here in Gainesville.

Parra and Smich were awarded undergraduate research scholarships to pursue the project with professor Dave Bloomquist. Smich is conducting tests to determine the ideal desiccant to absorb water from the humid Florida air. Parra is designing the machine that will distill the water and make it drinkable. To make things more challenging, they've sworn off electricity for the project.

"It'd be pretty easy to do it with electricity," Parra said, "but we want to keep it all environmentally friendly." ▫

THE BUS Members of UF's chapter of the Institute of Industrial Engineers renovated a 1972 bus — bought off of craigslist — formerly used for NASCAR tailgating. Now it is entirely decked in Gator gear, from the upholstery to the paint to the couches. The bus was unveiled during the 2008 football season and is autographed by the 2008 BCS Champions, the Florida Gators. IIE hopes the bus will bring more people out to tailgate, especially alumni. The bus was paid for mostly out of pocket by members of IIE and could still use some donations for repairs. Don't forget to look for it on Facebook and join the bus for football-fun next fall.

CLOCKWISE FROM LEFT: JASON HENRY; ISTOCKPHOTO; ISTOCKPHOTO

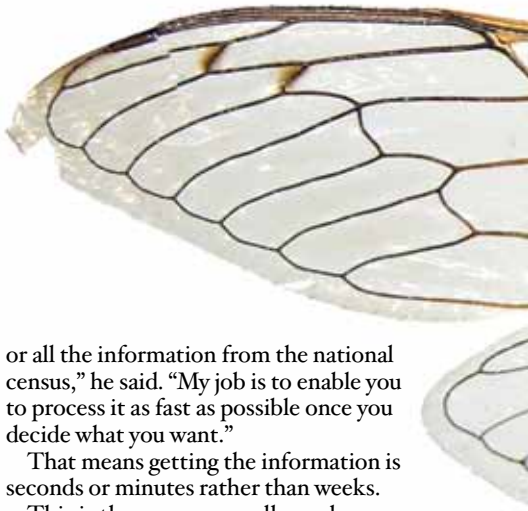
IN THE NEWS 01.09

ENGINEERING BETTER, GREENER AND SMARTER LANDFILLS

Bioreactor technology research conducted by Tim Townsend in the UF Department of Environmental Engineering Sciences is helping to increase landfill life. Recirculating leachate, the grimy water created when rainfall mixes with trash, can shrink any given garbage mountain enough to add 20 years of life to a landfill. The leachate is collected and injected back into the pile with great force. This helps biodegrade the garbage more rapidly while landfill operators can control the methane gas produced. The gas is then sent to a nearby energy plant rather than into the atmosphere, where it can contribute to global warming.

IT'S COMPLICATED

This isn't a Facebook relationship status update — it's research. So it's no surprise that it's, well, *complicated*. Take a gander at a sample of the College's most innovative, complex and eye-widening endeavors. BY DOUG McINNIS



Finding a Needle in a Database

Gator Engineering is making massive data analysis — the type measured in weeks instead of minutes — fast.

The trick is to take a high-tech short cut. Rather than analyze all the information in a database to get a very precise answer. Alin Dobra, an assistant professor of Computer & Information Science & Engineering, writes software allowing searchers to get a very good approximation of the answer by going through a representative sample.

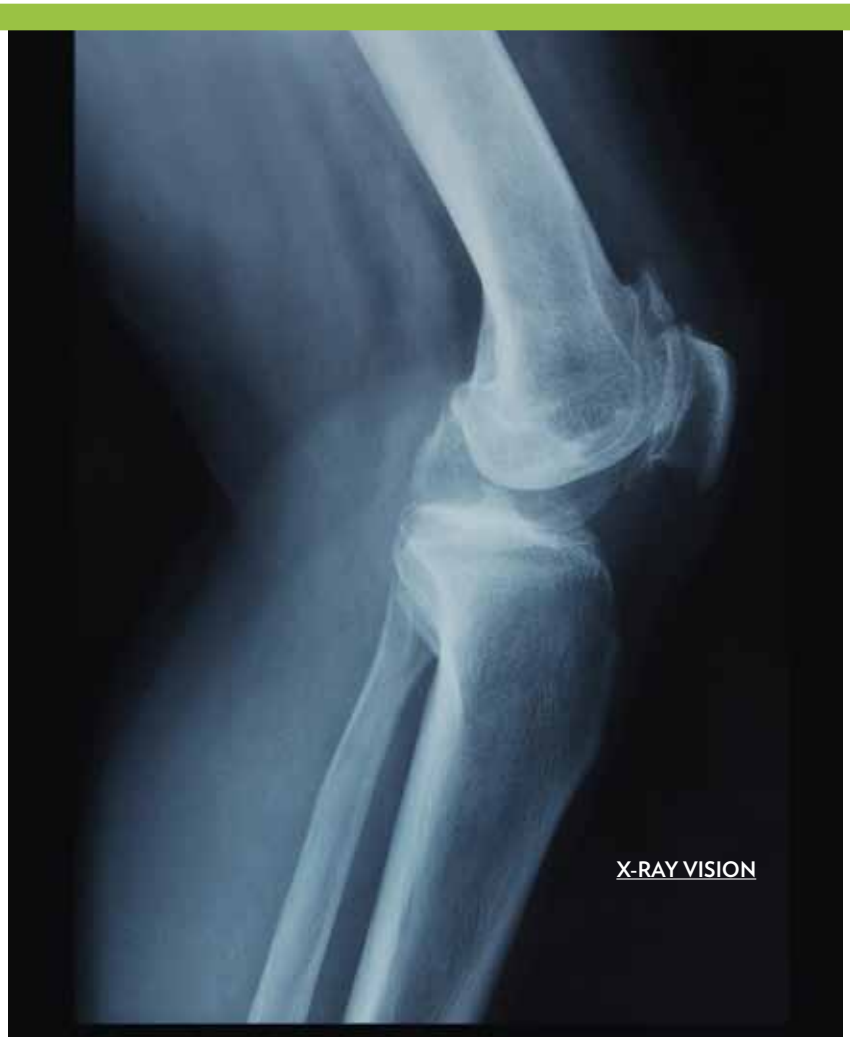
"The main issue with data is that we're very good at storing it, but not so good at processing it to create meaningful information," Dobra said.

The largest databases are measured in petabytes (1 million gigabytes) and contain more information than any human could go through in a million years. Even high-speed computers can't wade through that much information quickly. A single data query could take days or weeks to complete.

"My interest is in speeding up data processing when large databases are involved, such as all the information that Wal-Mart needs to run its stores, or all the information from the national census," he said. "My job is to enable you to process it as fast as possible once you decide what you want."

That means getting the information is seconds or minutes rather than weeks.

This is the same way polls work. Polling firms don't have the money to interview 200 million people, so they interview a representative sample of 3,000, Dobra said. The key to making this approach work is indicating how good the approximation is. For instance, a political poll may state it is accurate within three percentage points, plus or minus.



X-RAY VISION

A Joint Discussion

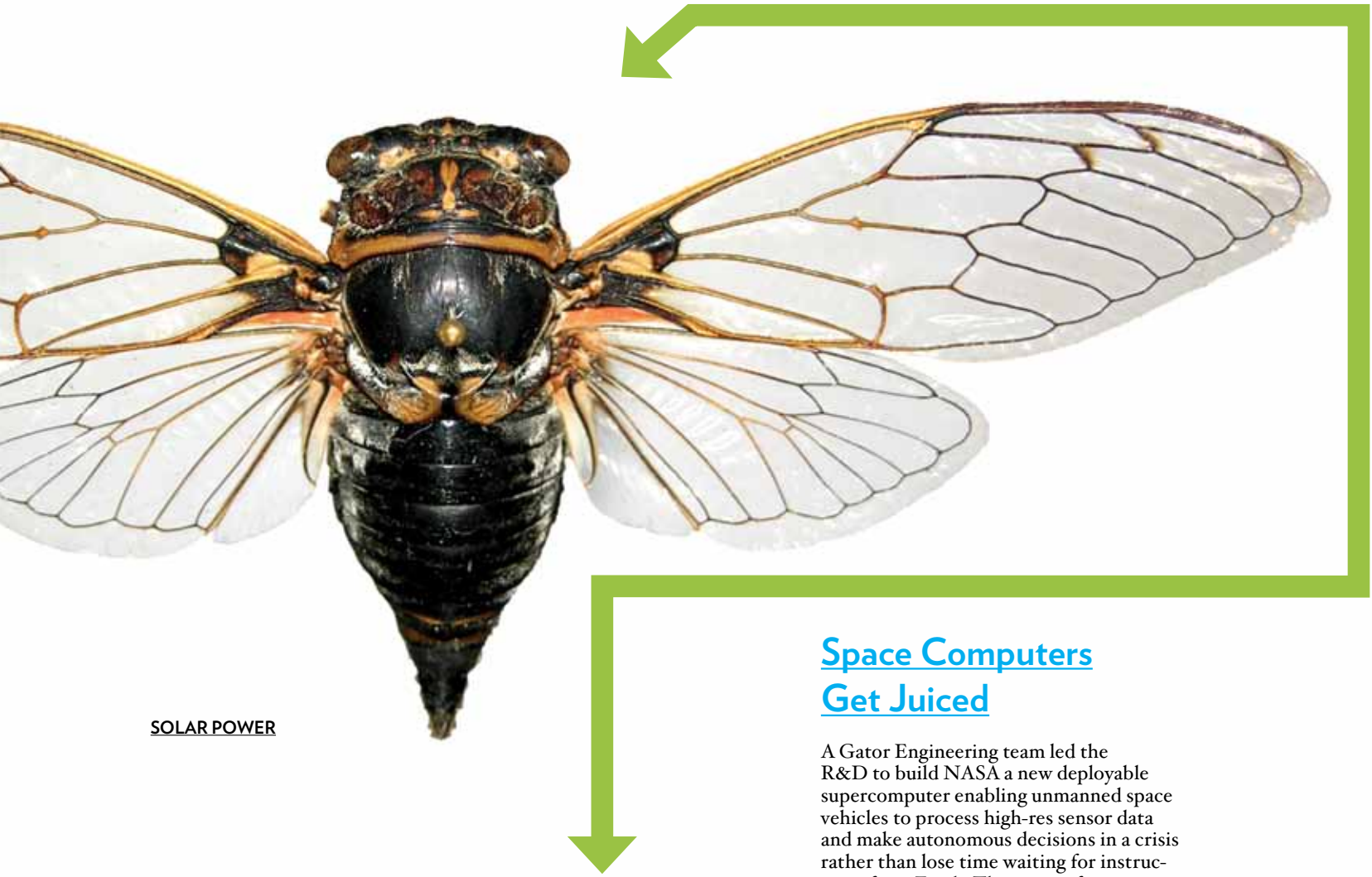
University of Florida researchers will soon be able to X-ray joints while in natural motion — by combining X-ray video, motion-capture cameras, and high-performance robot arms.

The robot assembly precisely tracks the knee joint movement of a person climbing up and down stairs, or the shoulder motion as the person reaches for an object. It uses two standard off-the-shelf industrial robots normally used for robot-assisted surgeries and silicon-chip manufacturing. But specialized software written by Mechanical & Aerospace Engineering assistant professor Scott Banks' graduate students allows the robot to precisely and safely track human movement. The next phase, requiring additional funding, will mobilize the robot arms so they so can track a person walking fast or running.

"Surgeons have wanted to see how joints function when they were moving or bearing weight," Banks said. "But with current technologies, it is impossible to view inside the joints during activities like walking."

For instance, surgeons often encounter difficulties diagnosing problems with the kneecap, shoulder and spine. With the new robotic imaging system, surgeons will be able to better gauge the nature of a joint injury, thus minimizing unnecessary surgery and increasing the chance for a successful outcome.

"A big part of the surgeon's job is to figure out exactly what is wrong before operating," Banks said. "If they knew how the joint was moving prior to surgery, they could go in with a specific plan and have greater confidence that they are performing exactly the procedure needed to restore the patient's function."



SOLAR POWER

ROBERT BIEDERMANN

A Moth's-Eye View

Engineers are incorporating nature's genius into commercially-available solar panels to produce more efficient solar cells by duplicating the light-absorbing landscape of a moth's eyeball.

When light hits a solar panel, some of it is reflected. Currently, at certain wavelengths, more than 10 percent of the solar energy is lost. Peng Jiang, an assistant professor of Chemical Engineering, says the moth-eye inspired cells lose less than 1 percent of the solar energy striking them.

Working with graduate students and Bin Jiang, a mathematician at Portland State University, Peng Jiang discovered a second natural masterpiece that can help eliminate the glass layer, cutting, manufacturing, installation, and operating costs for commercial solar panels. The glass-encased panels protect silicon solar cells from dirt and rain, but laboratory models show the cells can be made to mimic the self-cleaning cicada wings. Such breakthroughs could help make solar energy more cost-competitive with fossil fuels, and Jiang is talking with solar panel manufacturers about commercializing these processes. If he is successful, improved solar collectors would be another forward step in the effort to cut the man-made greenhouse gas emissions many scientists say is a central cause of global warming.

Evolution has created the properties found in the moth's eye and the cicada wings over millions of years, Jiang said. "I tell my students — look at nature first. Nature has evolved systems that are better than anything we can create."

Space Computers Get Juiced

A Gator Engineering team led the R&D to build NASA a new deployable supercomputer enabling unmanned space vehicles to process high-res sensor data and make autonomous decisions in a crisis rather than lose time waiting for instructions from Earth. The system features innovations enabling the team to replace special radiation-protected parts with the latest off-the-shelf technology — faster and cheaper.

Led by Electrical & Computer Engineering professor Alan George, in collaboration with Honeywell, the team designed a novel, adaptive system with both redundancy and computational power. The space-based system's array of parallel computing resources largely focus on crunching data, but could quickly switch to provide redundant data streams when bouts of cosmic radiation are likely. Conventional space computers have radiation-resistant parts, and are loaded with redundant features so if one set of data is corrupted, another set is created to take its place. But this static redundancy gobbles computer power and the special parts gobble space that could be used for bigger processors. Funding came from NASA and the Florida High Tech Corridor Council.

"NASA has an insatiable appetite for computing capacity in space," George said. "The agency has wanted to put a supercomputer in space for many years, but this is the first time anyone has achieved a technology that could be deployed. The previous attempts all failed."

Mercury Pollution Solution

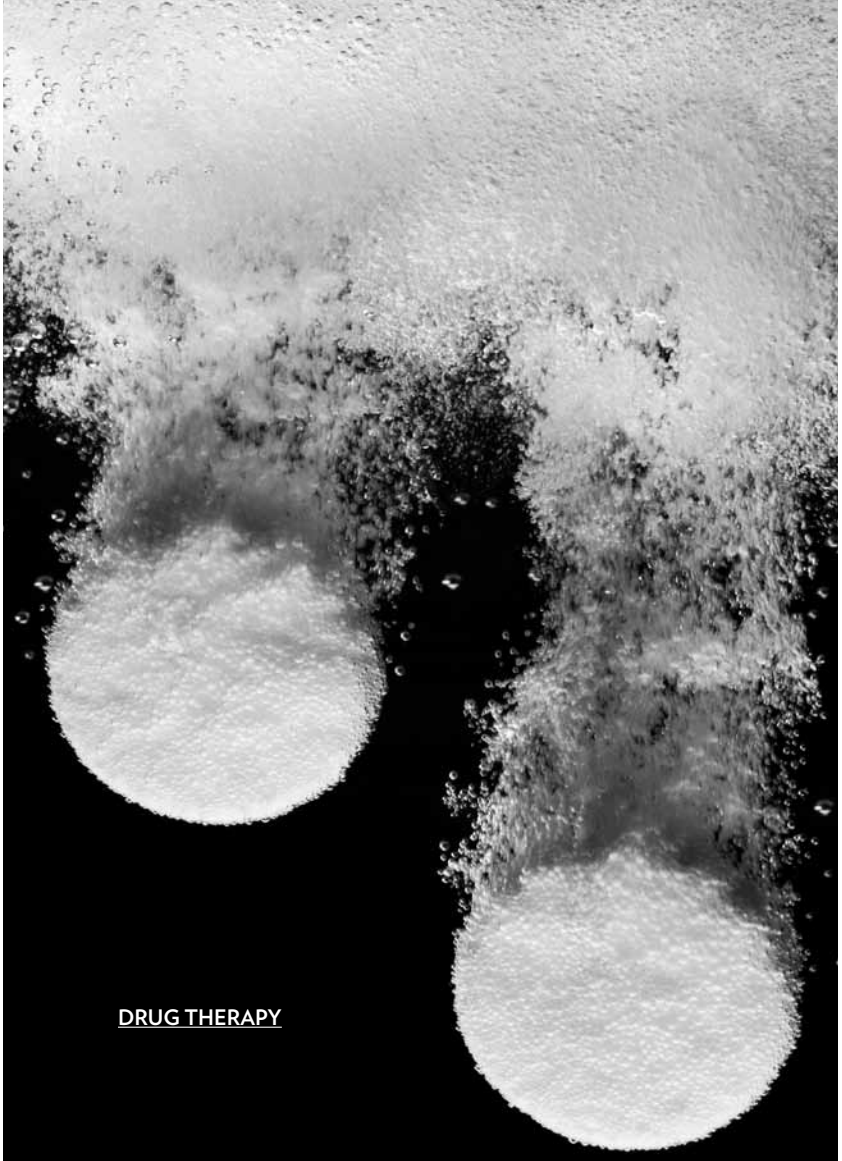
Anthropogenic mercury pollution and coal-fired power plants account for more man-made releases of mercury than any other source, according to the U.S. Environmental Protection Agency. Once in the atmosphere, it can work its way into the human food chain, and lead to developmental disabilities in children.

C.Y. Wu, an Environmental Engineering Sciences associate professor, plans to eradicate the problem by using a catalyst to convert mercury vapor into mercury oxide, mercury chloride, or mercury sulfate. Scrubbers and precipitators are the main forms of power-plant pollution control, but they can't capture mercury vapor. These compounds are water soluble so water-based scrubbers can remove them, and they are particulates that can be snagged by an electrostatic precipitator.

"It would be cheaper than using activated carbon," Wu said, and would require only a receptacle to hold the catalyst. No additional energy would be required to run the system; the existing heat from power-plant flue gases would be sufficient to power the system, he said. In addition, the catalyst could be used continuously because it wouldn't be consumed in the reaction.

The catalyst discovered by Wu and former graduate student Ying Li consists of silica, titanium dioxide and vanadium pentoxide. Now the engineers must try to convince the electrical industry to adopt their system. Power plants use 3,000 pounds of activated carbon to adsorb one pound of mercury vapor.

MERCURY MITIGATION



DRUG THERAPY

Drug Trafficking — To Your Brain And Spinal Cord

"I'm interested in overcoming barriers to drug transport," said Malisa Sarntinoranont, an assistant professor of Mechanical & Aerospace Engineering. "With a lot of promising new drugs for cancer, Parkinson's disease, epilepsy, and pain, transport problems have become a bottleneck issue."

She is working with Thomas Mareci, professor of molecular biology, and Paul Carney, a pediatric neurosurgeon at the College of Medicine, on a $1.7 million study funded by the National Institutes of Health.

The trio hopes to determine how drugs move along with brain and spinal cord fluids that act as delivery agents. The team will also study drug-delivery efficiency using timed-release infusions from a syringe pump, which create the flow needed to carry drugs through the brain and spinal cord. Without an artificially induced flow, the movement of drugs through the brain and spinal cord is slow. "If you do nothing, it will take a while for the drugs to diffuse evenly," she said.

The research starts with computer modeling of drug transport, shifts to tests using artificial mediums which simulate tissues and brain and spinal cord fluids, and then moves to tests with laboratory rats. "To really test our models, we need to do these tests within living tissues," Sarntinoranont said.

"This is an overlooked area of research," she added. "But if we can understand the underlying mechanism of how drugs are transported, we can increase their efficacy by assuring they go where you want them to go."

TOP RIGHT: NICHOLAS RIGG; BOTTOM LEFT: ISTOCKPHOTO

JASON HENRY

IN THE NEWS | 01.09

LEADER OF THE PACK

Determination, know-how, drive, commitment and creativity are just some of the tricks David Norton will be using as he leads Gator Engineering research initiatives. BY DEBORAH SWERDLOW

Recently appointed Associate Dean for Research & Graduate Programs David Norton has a broad vision for the College's research portfolio.

"One of the things that I hope to do is to aggressively encourage faculty to put together multi-investigative or multi-disciplinary-type proposals not only to the state but also to federal agencies," Norton said. These types of proposals would involve faculty members across the College and University.

He said he is also looking forward to opening the Biomedical Sciences Building. It and the new Nanoscale Research Facility will both foster interdisciplinary research.

Norton said he will continue collaborating with industry leaders and move forward with ongoing energy research, especially with his predecessor, Tim Anderson, leading the Florida Energy Systems Consortium.

"Particularly when you do that in a period of economic difficulty, in fact, you can be part of the engine that drives the economy toward the upswing by helping companies to develop competing technologies," Norton said. "You can actually be part of the solution." □

iSOLDIER

A new technology closes the cultural gap in war zones, giving troops the ability to communicate with civilians by using iPods — thanks to a Gator Engineer. BY MARILEE GRIFFIN

A NEW KIND OF PLAYLIST
iPods garner a whole new meaning during wartime when a soldier is able to communicate with foreign citizens using video, phonetic pronunciation and the written word.

During a recent deployment, a colonel told an Iraqi civilian to lie down on the ground, but the man did not understand. The colonel spent many unsuccessful minutes trying to explain before having to physically lie down himself to get the point across.

After being sent back to Iraq with Vcommunicator Mobile on his iPod, the colonel was able to read the words phonetically in Arabic to civilians, as well as see culturally-specific hand gestures demonstrated by a virtual human being.

This technology, developed by Vcom3D Inc., is primarily being used by the U.S. Army in Iraq, Sudan and Afghanistan to help soldiers communicate more effectively.

"Many times, higher-level officers will have interpreters, but many soldiers walk the streets without any way to communicate," said Vcom3D CEO Carol Wideman (M.S. ISE '79). "This gives them the ability to communicate their intent and start to build a relationship."

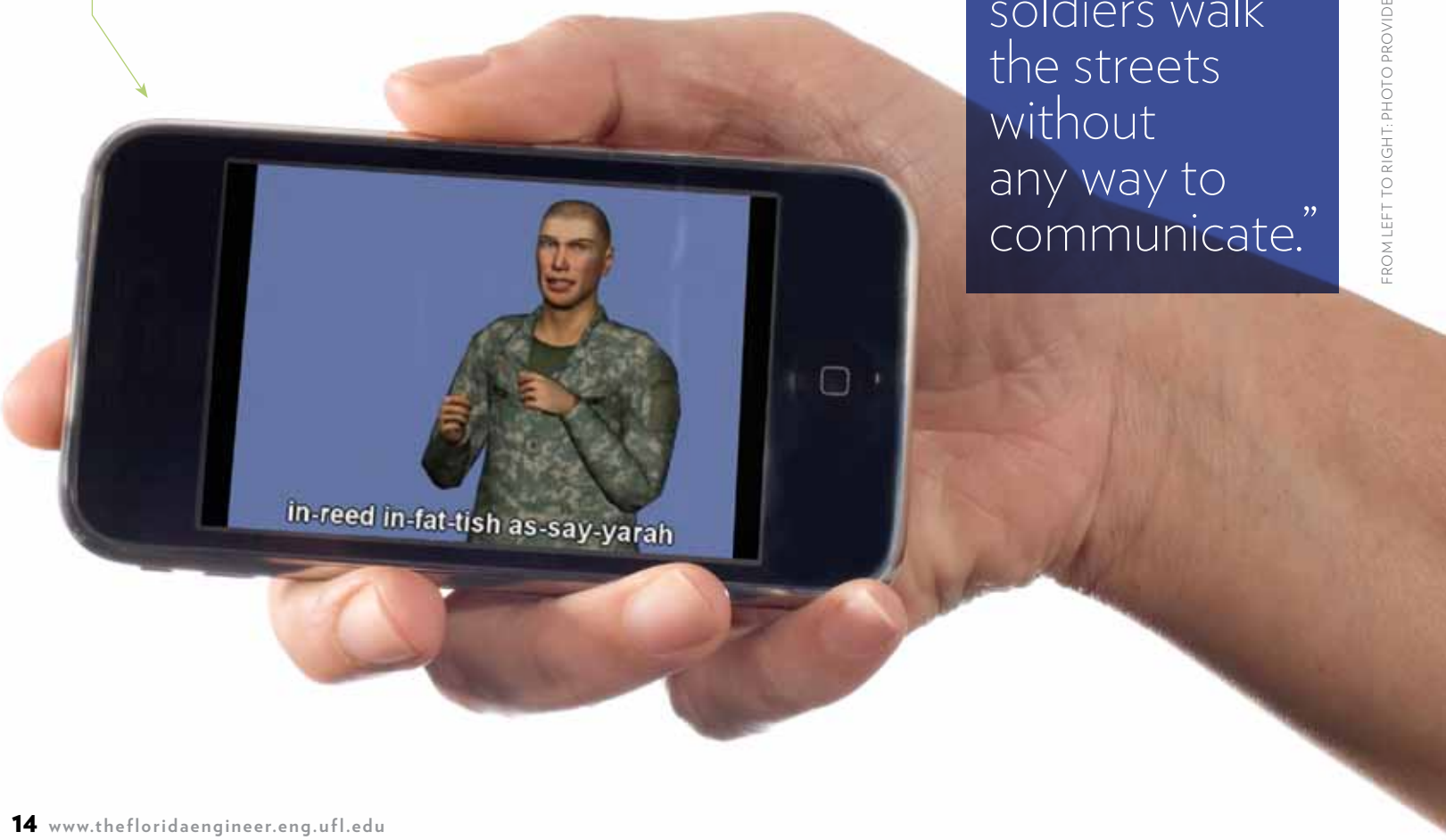
Wideman explained how the University influenced her: "I think the most important thing was we really learned the concepts behind something. It wasn't just surface-level so you could pass a test — you really learned how to think things through."

Originally, Vcom3D created 3-D characters to lip-synch and perform hand gestures as a way to teach American Sign Language. The program was adapted for iPod (and now iPod touch) and attached to an armband.

A soldier saw this and suggested the product be adapted for the military; within a month, there was a prototype. The finished result: a cultural learning tool that teaches soldiers how and what to say during missions, whether it's a vehicle checkpoint or a raid. Soldiers are able to see phrases like "Can I see your I.D.?" in Arabic, phonetically and, finally, as a video — so they can see the accompanying hand gestures.

About 800 Vcommunicator Mobile devices are currently being used overseas. □

> "Many times, higher-level officers will have interpreters, but many soldiers walk the streets without any way to communicate."



FROM LEFT TO RIGHT: PHOTO PROVIDED BY VCOM3D INC.; JASON HENRY

ILLUSTRATION BY JOHN DUNNE

THE SAVVY ENGINEER

While the economy is faltering and the unemployment rate climbs each month, the Savvy Engineer stays hopeful. Human resources experts offer advice for navigating the market. BY TED PETERSEN

The current job market is perilous. The unemployment rate has soared to more than 8 percent, according to the U.S. Department of Labor Web site. Even Microsoft, one of the nation's strongest companies, announced plans to cut 5,000 jobs. Some workers have resigned themselves to large pay cuts just to get back into the work force.

Engineers aren't immune. Google is closing its three engineering offices, though they hope to retain their employees, the Los Angeles Times reports. United Technologies Corp. recently announce nearly 12,000 job cuts. As the manufacturing industry contracts, so too might engineering jobs, CNNMoney.com reports. The Engineering Society of Detroit is even held an event to give engineers information on alternative careers.

But there is hope for the Savvy Engineer. Here are seven things engineering graduates or engineers between jobs should remember about navigating the unfavorable job market.

FINDING THAT SILVER LINING

"After working two years with a sizable engineering firm, I was laid off. That was about six months ago. After a few months of searching, I found a job. I'm currently working 30 hours a week for a civil engineer who went out on his own a few years ago. I'm learning more than I did at the larger firm, I have flexible hours, and a great work/life balance."

— MICHELLE LIGHTBOURNE RAMSAY, B.S. CCE '06

KEEP YOURSELF EMPLOYABLE

Cindy Kane, director of corporate relations at Harris Corp. in Melbourne, Fla., said engineers should continue to learn by taking advantage of extra training and courses.

BROADEN YOUR HORIZONS

See how your skill set might work in a different industry, said Erik Sander, director of industry programs in UF's College of Engineering.

BE WILLING TO RELOCATE

Kane said this will open more options. You can probably find work, but maybe not in your hometown.

APPROACH THE JOB SEARCH LIKE AN ENGINEER

David Loucks (B.S. MAE '75), vice president for human resources with Procter & Gamble, said analytical thinking and problem solving are key skills for engineers. Use the job search to show evidence of those skills. The job search is just one more problem that needs solving.

NETWORK, NETWORK, NETWORK

Sander said Gator Engineers shouldn't underestimate the power of the Gator Nation.

BE A LEADER

Loucks said employers are looking for evidence of hard work (read: GPA) and evidence of leadership. Gain that leadership experience to demonstrate to employers your ability.

BE PATIENT

The industry will survive the economic downturn, and companies want to be in a strong position when the economy turns around. Companies are always looking ahead, Sander said. The Baltimore Sun reported that with the Obama administration's focus on infrastructure, engineering jobs will likely open up. □

OFF THE WALL

Wherever engineers congregate, rest assured there are some pretty peculiar items just lying around. This is especially true in a building like Weil Hall, the hub of the College's disciplines. But if you're like us, you could pass by these things every day without ever paying attention. So we decided it was time to get the stories behind some of these items — and boy did we learn a lot. **BY MARILEE GRIFFIN**

THE ONE-ARMED MACHINE

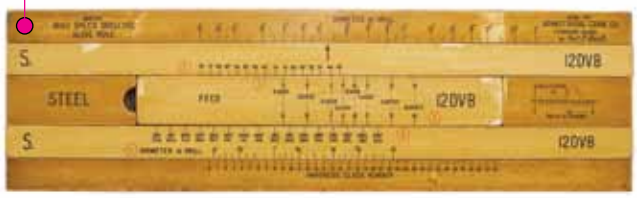
This robotic arm is part of an ISE lab in the works to teach students about microprocessors, production line and work design. According to Cristián Cárdenas-Lailhacar, faculty and technical manager in the Industrial Assessment Center, the aim is to prepare students for industry by giving them hands-on experience. The project will consist of putting pieces of equipment — including two more arms — on a conveyor belt (built by students) and building an intelligent interface so the arms follow instructions to create a manufactured product at the end of the assembly line.

OLD SCHOOL

This photograph was taken around 1910, during the construction of the Panama Canal. The men in it are famous among civil engineers as the brains behind the canal. Professor Ralph D. Ellis kept the photograph as a souvenir from his research on the Panama Canal from 1975 to 1985. "This is actually one of the great engineering achievements in the United States — the design and construction of the Panama Canal," Ellis said.

LET IT SLIDE

This Carl Barth original slide rule, dated 1926, once determined the best speed and feed settings for drilling steel — but it has been replaced with new technology. Years ago, civil engineering lab manager Chuck Broward rescued it from being trashed, and it now holds a place of honor in the lab's "Museum of Oddities and Broken Things."



WEIL HALL

WATCH YOUR STEP

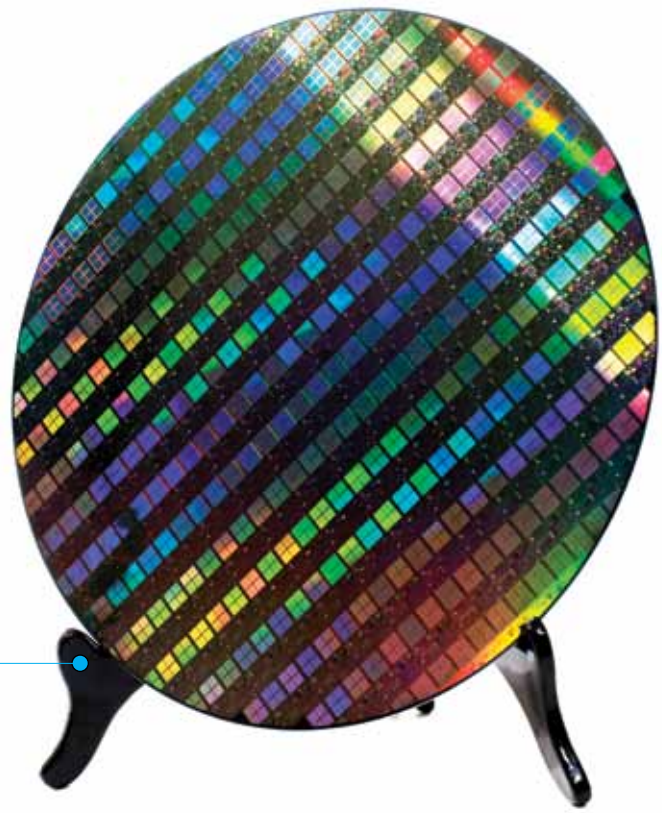
These two defused land mines from the Computational Science and Intelligence Lab represent some of the 60 million to 100 million still active around the world. Researchers in the CISE lab, which is in part funded by the Army Research Office, started developing ways to detect and defuse land mines as part of an initiative during the Clinton presidency — when the goal was to rid the world of mines by 2012.

SODIUM SENSOR

Coastal professor Arnoldo Valle-Levinson takes his students on field trips to estuaries around mid and north Florida so they can get real physical oceanography experience. One of the instruments always in tow is the CTD — the Conductivity Temperature Depth Recorder. The CTD is lowered into waters of the estuary, and when water is suctioned and expelled out of a tube, sensors reveal how much electrical conductivity — or salt — is in the water. This reveals whether there are drought conditions or not, whether animals and plants will thrive and the extent the estuaries can withstand pollution.

EARLY INTEREST

This Popsicle-stick bridge is on display in the Society of Hispanic Professional Engineers' office on the second floor of Weil. An Oak View Middle School student made it last year during SHPE's Community Outreach Month. Each year, SHPE picks a middle school to donate time and computer programs to. "This way, we get kids interested in science and math at an early age," said member Tatiana Pimentel. The Popsicle bridge competition is part of their introduction to civil engineering.



SMARTER THAN 350 GENIUSES

This is the heart of 350 laptop computers. This 300 mm Silicon wafer, when fully processed, is the equivalent of 350 Pentium chips, making it worth around $50,000. It takes about a month to finish all the processing for a wafer this size, and semiconducting manufacturing companies like Intel are working to double the number of transistors on each chip every 18 months. There are significant problems involved in processing these wafers, so these companies call upon the Materials Science & Engineering department. "There's a tremendous number of materials challenges in making the transistor smaller and thus your computer faster," said MSE chair Kevin Jones.

JASON HENRY

DOWNSIZING
UF Mechanical & Aerospace Engineering associate professor Norman Fitz-Coy holds out the SwampSat, a satellite designed by the Small Satellite Design Club. Fitz-Coy is the director of the Advanced Space Technologies Research and Engineering Center.

JASON HENRY

GETTING CENTERED

A new era of partnership between universities and industry is underway, thanks to the National Science Foundation's Industry/University Cooperative Research Centers program. Initially, a center is funded by the NSF with the provision that the industry provides support to the center, and the center conducts industrially relevant research. UF's four I/UCRCs are doing just that, in vastly different fields of engineering. **BY DEBORAH SWERDLOW**

	Center for Particulate & Surfactant Systems (CPaSS)	Center for Autonomic Computing (CAC)	Advanced Space Technologies Research and Engineering Center (ASTREC)	Center for High-Performance Reconfigurable Computing (CHREC)
WHO	Distinguished professor of Materials Science & Engineering **Brij M. Moudgil** is the UF director for this center, which is a joint project with Columbia University in New York.	UF Electrical & Computer engineering professor **Jose Fortes** directs CAC, which is a joint partnership with the University of Arizona and Rutgers, the State University of New Jersey.	UF Mechanical & Aerospace Engineering associate professor **Norman Fitz-Coy** directs this center, which is a partnership with North Carolina State University.	UF professor of electrical and computer engineering **Alan D. George** directs the center, which consists of four university sites (University of Florida, Brigham Young University, George Washington University and Virginia Tech) and some 30 industry and government partners.
WHAT	The center is focused on advancing understanding and research of particulate and surfactant systems, which are crucial to developing everyday products such as detergents, cosmetics and prescription drugs. CPaSS is headquartered at UF and is one of the "research clusters" of UF's Particle Engineering Research Center.	CAC works on developing self-managing computer systems and applying these techniques to information technology infrastructures.	ASTREC is aimed at developing long-term partnerships among universities, industry and government. It will improve small satellite technology in a larger effort to build satellites more quickly and at a lower cost.	CHREC (pronounced "shreck") focuses on the field of reconfigurable computing, defined as application-oriented, software-controlled, hardware-adaptive computing where device/system hardware structures can dynamically morph to achieve higher speed, efficiency and versatility with lower power, heat, size and weight.
WHEN	The center was established in April 2008.	The National Science Foundation awarded the grant in February 2008.	The center officially kicked off in mid-November 2008.	The center became operational in January 2007 and was the first I/UCRC at UF.
WHY	Combining our particles knowledge and expertise with Columbia University 's knowledge of surfactants made a lot of sense. "The two themes together can help maintain existing companies and potentially attract new ones," said Director Brij M. Moudgil.	NSF chose UF to be the lead institution for the center because their were a number of research projects on autonomic computing underway. UF was interested, in part, because the center brings together industry partners.	The space industry is a major component of Florida's economy, but the state doesn't conduct a great deal of space research. ASTREC will be the first center in the Southeast devoted to developing small satellite technology.	This NSF center is fashioned in the style of a research consortium, bringing together several dozen key groups in academia, industry and government to advance the field of reconfigurable computing for a broad variety of missions and applications, from satellites to supercomputers.
HOW MUCH	The operational budget is more than $750,000 a year.	According to the prospectus on the center's Web site, the initial operating budget was projected to be about $1.5 million a year.	The operating budget is approximately $750,000 a year.	The total operating budget for CHREC is about $3 million a year.
POTENTIAL IMPACT	Research conducted at CPaSS could lead to the development of medicines with fewer side effects; more effective screening for diseases; more eco-friendly detergents and other household products; and more efficient manufacturing, disposal and recycling of waste products.	To increase the efficiency of large-scale infrastructures, such as Google and IBM. Self-managing computer systems could be faster, more cost-effective and more reliable than current systems — even the environmental impact could be reduced.	ASTREC will provide many networking opportunities for UF engineering professors and students by bringing university and industry leaders to the same table.	A growing number of computing applications, from space-based sensor processing to computational biology, face fundamental challenges in attaining required performance, adaptability, and dependability while limiting energy, cooling, and size, and are increasingly turning from conventional to reconfigurable technologies.

People look at the world through different lenses. Diverse views reveal a bigger picture and equip today's engineers to better solve societal problems. *by* **STEVE MILLER**

TRUTH BE TOLD

RECIPIENTS OF E-MAIL from Roberto Hernandez, a UF engineering grad, are advised in a message signature, "Before printing, think about the environment." It's a somewhat benign sentiment given this day's obsession with all things environmental.

But it's also indicative of the evolving direction of engineering and engineers. Hernandez is 25 years old in a field in which experience has heretofore been a hiring rule, and his green ethos reflects an emerging diversity among freshly minted engineers. In this case, it is not so much diversity in strict accordance to ethnicity, race or gender, but a wider-reaching and more inclusive diversity. Variations on age, sexual orientation, life experience and thought processes now color the engineering field.

"It's the idea that there are many ways to solve a problem and as a diverse group, we have that ability to approach a problem differently," notes Angela Lindner, the College's associate dean for student affairs. The byproduct of this quest for differing views and approaches, of course, leads directly to the more traditional, race-based notion of diversity, which is blossoming.

The Society of Hispanic Professional Engineers has grown from 235 student and professional chapters to 306 — 30 percent — in the past five years. The National Society of Black Engineers saw its annual membership collections jump 87 percent between 2002 and 2005.

The College of Engineering at UF continues to lead the academic pack: UF consistently ranks among the top handful of public and private institutions in the number of bachelor's degrees in engineering awarded to minority students each year. While it feels and looks good, the truest diversity goes back to Hernandez and his noble suggestion to save a tree.

This is the engineer with the diversity of tomorrow, one who is conscious of the world and the people in it. It's engineering with a heart. Whether that breeds diversity or the other way around, well that's a proposal that can be examined in a number of ways.

I GOT HERE

and no one looked like me. I was the odd man out for sure. I am a Sikh, so I wear a turban, and this country had already seen 9/11. No one had seen a guy in a turban and shorts, or a guy on roller skates wearing a turban. I started wearing a sports cap because I wanted to fit in, but after about half the semester, I realized I didn't want to lose my identity. And I looked much smarter in a turban.

One of the biggest stereotypes about people from India is that we are all somehow great engineers. This is a different side of diversity isn't it? But I see Americans who do their undergrad work and move on up through their master's and they are stunning, just really as good as anyone. One of the reasons we are seen as so much better is we've had, maybe, our schooling in India, and have worked in the field for a few years. Then we come to get our master's or post-grad work, so we are better qualified, like me. I had a bachelor's in electronic engineering when I got to UF. We also have very hard work at the high school level in India, 500-question math tests. One thing I noticed about being from India and looking for an engineering job is how level it is all the way through. It's not as if anyone gets preference, and I don't see any resistance to hiring someone of a different culture or race. It worked out fine. It still does. Engineering is a place that seems to welcome everyone.

TARUNDEEP SINGH BATRA

M.S. '07
Computer & Information Science & Engineering

CURRENT POSITION
IT Associate, Morgan Stanley, New York

HOBBIES
Reading inspirational books, tennis, badminton, travel

ENGINEERING INSPIRATION
I had worked to get into a good university in India for my undergrad work and failed, while a lot of my friends got through. I knew they were going to go on to some very good companies and I was going to have to work harder. I began reading more, studying harder and going to events. It was this hard work that moved me to become an engineer.

BEST ADVICE
It's a conclusion that I came to myself, which is, "Try to reach out for what you want even if it is difficult to find. If it seems too hard, try a different approach."

IF NOT AN ENGINEER, I'D BE
A musician. I play the piano. I still want to be a professional musician some day.

THEME SONG
Any song by Yanni

PREVIOUS SPREAD: MATT WRIGHT-STEEL; THIS PAGE: GABRIELLE REVERE

ROBERTO HERNANDEZ

B.S. '07
Electrical engineering

CURRENT POSITION
Business Development Manager/ Space Systems, Harris Corp., Melbourne, Fla.

HOBBIES
Travel, golf

ENGINEERING INSPIRATION
My father was an electrical engineer at Palm Beach International Airport. At home, he was always fixing TVs and messing with old audio systems. That made its way into my head.

BEST ADVICE
A friend of mine at Harris told me "true leaders always stand on the shoulders of giants." It means no one gets anywhere by thinking you can do it all by yourself.

IF NOT AN ENGINEER, I'D BE
A pro golfer or pro baseball player

THEME SONG
"Theme from New York, New York" (Roberto says he just feels that NYC is his kinda town).

I WAS HIRED at Harris when I was 24 and right away there was this "Hey, who's the intern?" thing. I knew I had some barriers to break through. It's an institution, Harris, and age is recognized. We have the NASA graybeards — that's what they are called — our guys that used to work at NASA. We go to them when we need feedback about the past and need to understand where some companies might come from.

At first, I had to represent myself in a way that lets them know I am a full-time employee and am there to work alongside them. It takes a little bit of time. It's like...imagine you are going to college but everyone you are going to school with is your professor. I saw there was apprehension at first, like I was wading on their turf.

There is a huge difference in the generations; in the way we work in engineering. The older engineers were great executors. They are given a problem to solve, and it's like "here are the steps, one through five." And they got through those steps and did a great job. [My generation] is more likely to look at the problem and say, "I'm going to start at step six and may not do step three." It's a different approach, not as controlled. We like to create and think differently, which really works here. They really try to create a diverse group of people. If I filled the room with people who looked just like me, I would be missing the boat.

WOLFGANG SIGMUND

Class of '87, University of Heidelberg, chemistry;
1992, Ph.D., Max-Planck Institute of Polymer Science in conjunction with the Gutenberg-University of Mainz, Germany

CURRENT POSITION
Professor, University of Florida Department of Materials Science & Engineering

HOBBIES
Triathlon, marathons, film, gardening, traveling

ENGINEERING INSPIRATION
The idea that in science you never get anything out that is useful for society, but in engineering you use the sciences and make something from it.

BEST ADVICE
My father told me to be happy and to do what I think is the right thing to do in life.

IF NOT AN ENGINEER, I'D BE
Running my own business, manufacturing something

THEME SONG
Ode to Joy from Beethoven's 9th Symphony

I REALIZED

I was gay when I was 3 years old. When I started engineering, I discovered most people don't ask about it. I was going to school and someone might ask about family and so on. Engineering isn't like music or theater, where there are so many gay people. I know here at the University of Florida, most of the engineering students who are gay are closeted. It still feels like being gay is a liability in engineering. But in terms of diversity, being gay is an asset in a number of ways. It can be more difficult to have a family as we move through life, which means there's a lot of time to do more work and devote to studying. It turns a lot of us into overachievers.

As I grew up and gravitated toward science and engineering I had no role models. I taught myself. It was up to me to decide what was right and wrong. It allowed me to make logical decisions, to apply logic to everything, which applies directly to engineering. It's also helped me develop an ability to know about other people. And that helps me connect with students and professors. Being a minority also gives me more of a concern for other minorities and if they are having troubles, it tends to make me more inclined to help. I've been involved in both science and engineering. I always had this perception that science is a little more open to things and engineering is a logical extension to apply that science — even though the engineering atmosphere can be more conservative.

TIM HUSSIN

RHONDA D. HOLT

B.S. '86
Computer sciences

CURRENT POSITION
Senior Vice President, Digital Media Technology, Turner Broadcasting System, Atlanta

HOBBIES
Reading, golf

ENGINEERING INSPIRATION
In the summer of 1981, I worked at UF's agriculture department entering computer data on the fall armyworm. It was my first real exposure to computers and I was fascinated how this machine would do what I asked. I was hooked like a rainbow trout.

BEST ADVICE
Learn to be a great listener more than a great talker.

IF NOT AN ENGINEER, I'D BE
A math teacher

THEME SONG
"Breakout" by Swing Out Sister

YVONNE BOYD

I NOTICED

most of the people in my classes were men. It was rare in the mid-80s for a black female to be in engineering. I realized it was going to be a canary-in-the-mine kind of thing as I moved into the ranks as a professional.

Engineering overall wasn't very hospitable to women and when I started, there weren't all that many female engineers. I had very few female classmates in the College of Engineering. It didn't matter. I was raised with a high level of self-confidence and I just knew I was going into something that interested me. I've never thought of myself as powerful African American woman, but just a talented African American woman who can get things done. I don't even recall much talk about diversity. I was an Army brat — my dad was in communications engineering there — so I knew I was bringing something to the table already: experiential diversity. Growing up, I met people from different places and who held all kinds of perspectives.

Engineering is certainly more diverse now; I can cast a very broad net when I am looking to hire someone and find more people from different backgrounds. What makes engineering successful is this diversity of thought and experience and background you might not normally get without varying perspectives. With a strong varied team you have people who can tap their respective experiences in terms of worldview and ethnicity. They drive a certain creativity that, as a team especially, makes for a richer pool of solutions and can establish a connection between concepts that may have escaped you before. Engineering is very much more diverse today, but even now it's not as common to see women enter the field. I know that now, where I am, I can influence diversity in the field in how I staff my organization and in encouraging others to get into engineering.

CARLOS M. DEL SOL

B.S. '72
Industrial engineering

CURRENT POSITION
Vice President, Global Engineering Systems, Campbell Soup Co., Camden, N.J.

HOBBIES
Running, Gators, photography, travel

ENGINEERING INSPIRATION
When I was in college I had a summer job in Miami at an airplane parts manufacturing operation. I was a parts mover, the lowest job. I looked at the individual who ran the operation and he was an engineer. I told myself, "someday I will have a job like that." It motivated me, not so much that exact job, but the move to excel.

BEST ADVICE
My first manager told me to treat everyone with respect regardless of their position, and I would be able to learn from all individuals whether they were the janitorial staff or the CEO. This is something that has proven to be valuable, and I have lived by it my whole career.

IF NOT AN ENGINEER, I'D BE
I can't think of anything I'd rather be.

I WAS BORN in Cuba. When I was 12, my parents sent my younger brother and me to the U.S. so we would not grow up in a communist country. We initially lived with relatives and then moved to a foster home until our parents were finally able to leave Cuba. These experiences taught me the value of independence and hard work, to be disciplined and to be a problem solver. In addition, I learned to appreciate the values of this country and the benefits of living here. This diversity of experiences has driven my career. While in the eighth grade I realized I wanted to be an engineer. We had a class called Project Me where we looked at different careers. My exposure to engineering then was the first step in my journey to obtaining an engineering degree at UF.

During my professional career at GE and at Campbell, where I have been for the past 21 years, I've been able to apply my Hispanic heritage in support of projects in places like Puerto Rico, Argentina, and Mexico through the understanding of the culture and language. I'm a big proponent of exploring opportunities to market products to the Hispanic consumer. I never met much resistance based on my heritage, and everything I've achieved has been based on my values. Any setbacks I've had were a result of my performance, which is the way it should be. I work to recruit and retain Hispanic and diverse talent as part of developing the best overall team. You always want the best candidates and having a diverse slate is essential. The engineering field has been, historically, white-male dominated, but, things are changing with more minorities and women entering engineering. One way to continue this, is to encourage and support younger people to enter the engineering profession. I am pleased to be involved with FIRST (For Inspiration and Recognition of Science and Technology) and to be able to provide support to the STEPUP Program at UF, two programs that have successfully encouraged minorities to enter engineering. Diversity in the engineering world is changing from the perspective of gender, age, and cultural heritage. The new generation of engineers is going to change things for the better.

JARED CASTALDI

CHRIS HARTLOVE

I ARRIVED at the University of Florida in 1968 at the height of the civil rights movement, the women's movement, and the Vietnam War. When I went to my introductory engineering course, my first reaction was amazement at how many people were in the class. My second was how few women were in the room.

Male professors and students didn't like the fact there was a female in the class, and they would make blatant, detrimental comments, telling us that we didn't deserve to be there. I'm told that I was the only female in my graduating class in 1972. When I left UF, it was very difficult in the workplace. Discrimination was an ongoing battle. There was no legal or peer support, and there were no role models. It was a tough time. But something happened over the years, and my being a woman went from being a severe disadvantage to an advantage, given that I was different and people remembered me.

That's how far we've come. The number of women in engineering has risen, but it's more than that. Now, I rarely see anyone question a woman's ability just because she's a woman. This country has really moved forward. Look at who is our president. Those of us who were trailblazers in the marketplace have proven we can do the job as well as or better than our traditional male counterparts. My experiences shaped my view on people in engineering in a good way. I look for that different point of view when I look for talent. If you don't do that, then the field won't make the gains that it really needs to make.

LINDA HUDSON

B.S. 1972
Systems Engineering

CURRENT POSITION
President, BAE Systems Land & Armaments Operating Group, Arlington, Va.

HOBBIES
Yoga, International Women's Forum, adventure travel, reading, gourmet cooking, visiting with her grandchildren

ENGINEERING INSPIRATION
The space program. From where I lived growing up in Central Florida, I could see the rockets blasting off.

BEST ADVICE
My father told me "don't let anyone tell you that you can't do what you want to do."

IF NOT AN ENGINEER, I'D BE
Fighter pilot or an astronaut

THEME SONG
"My Way" by Frank Sinatra


OF THE ENTIRE STIMULUS PACKAGE
$179 BILLION
GOES TO ENGINEERING-RELATED RESEARCH
$787 BILLION =
ECON
$1 billion

OMIC REHAB

Barack Obama's $787 billion stimulus plan puts a premium on forward-thinking tech research in energy, conservation and infrastructure and makes it clear that if the U.S. economy is to bounce back and transform, engineers will play a vital role. **by Wayne Garcia**

ANYONE WHO DOUBTS JUST HOW MUCH the economic recovery will involve engineering services needs only look at Wall Street's reaction to the first news of the stimulus plan late last year.

On Dec. 7, 2008 then-President-elect Barack Obama announced he would seek to make the biggest investment in national infrastructure since the Eisenhower administration as part of a multi-billion-dollar attempt to halt the recession. The next day, stocks in engineering and construction companies high-fived each other with double-digit increases.

Jacobs Engineering Group, the second-largest publicly traded engineering company in the United States, saw its stock price rise 17 percent. The largest, Fluor, had a 13 percent increase. AECOM, a large provider of construction management and engineering to government construction projects, saw its share go from lows of $17.49 in late October to peaks of $32 in early January. Caterpillar, John Deere and other construction-equipment manufacturers likewise saw their shares revved up.

Yes, the economic stimulus plan will be a boon to engineering companies and provide engineering jobs. But that benefit is a two-way street. Over the next two years the nation will find itself relying on engineers to fuel a quick recovery. In the long run, the White House and Congressional leaders who drafted the stimulus bill envision new engineering research across all disciplines to transform the economy for decades to come.

"It's an opportunity to stimulate the evolution of engineering into a new era," said Tom Hunter, president of Sandia Corp. and director of Sandia National Laboratories, which develops science-based technology in support of national security.

"My hope is it will include areas where we can use the future human capital of the engineering profession in a whole new arena of problems," said Hunter, a 1966 UF mechanical engineering graduate who oversees $2.3 billion of research annually. "That will allow us to leverage the short-term issue into long-term results."

His assessment meets agreement from the University's top research administrator.

"There's no question we're in a paradigm shift in America," said Win Phillips, the University of Florida vice president for research and a former College of Engineering dean. "We've got to get used to doing things in different ways, many different ways."

Not just in the United States, either. The stimulus package's forward-thinking initiatives are just the tip of the iceberg of a global (and globalized) change in economies and society, a flatter, more interconnected world where sustainable technologies in agriculture, ecology, energy, transportation and health care, among other fields, must be found.

"The stimulus is a piece of a larger puzzle," said Engineering College Dean Pramod P. Khargonekar. "The world is going through a massive change. It will look very different in five years than it has looked in the past 15. Suddenly the equilibrium is going to change from what came before to what is coming after."

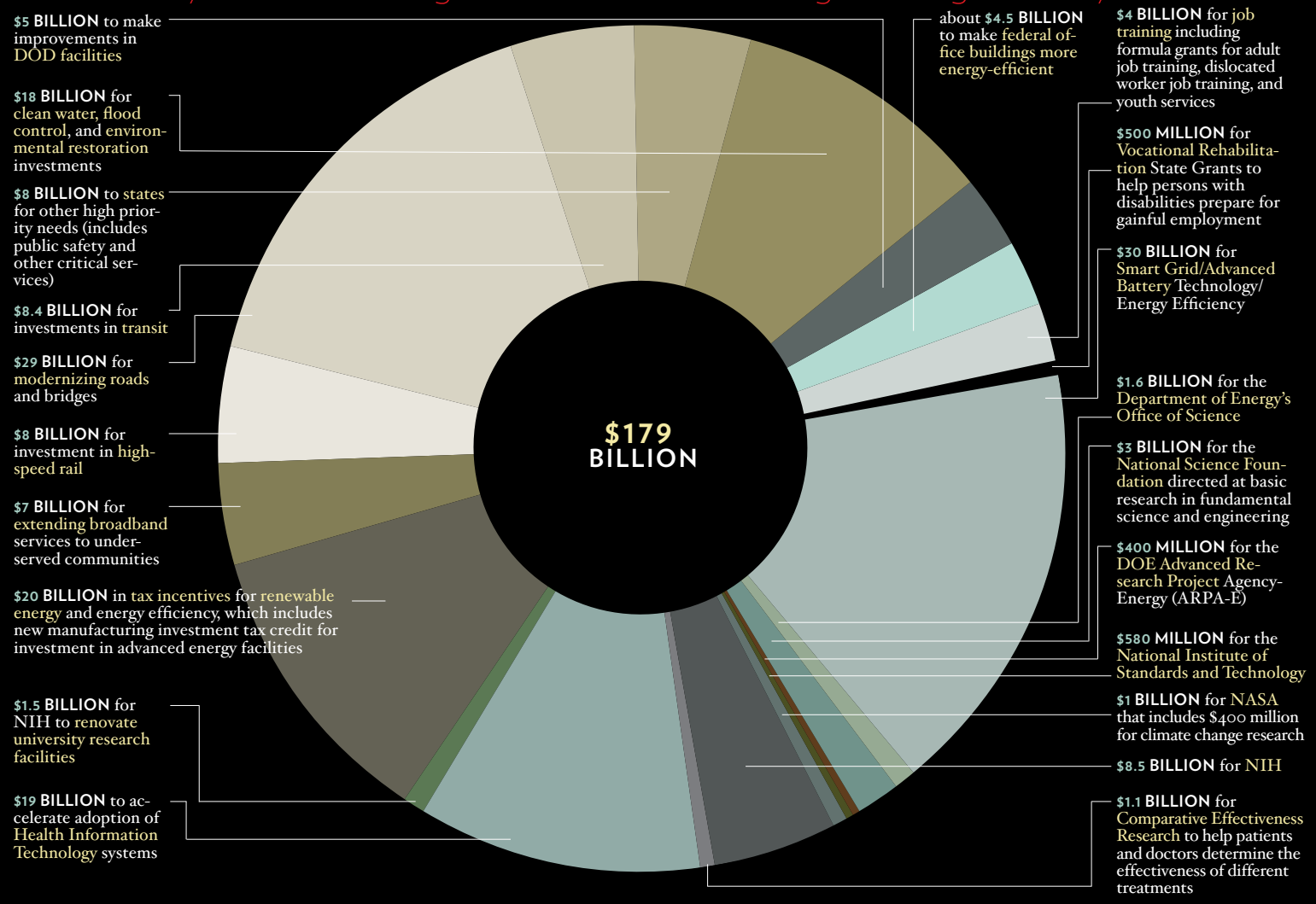
The "after" starts with the stimulus package.

President Obama didn't get quite all the advancements he wanted by the time the plan was approved on Feb. 13, after a vicious partisan fight and a compromise between the House and Senate that reduced the full stimulus package to $787 billion, down from original proposals as high as $825 billion. The final 1,071-page bill set aside $120 billion for infrastructure and science spending. More than $16 billion of that will go to technology research and innovation: $3 billion in National Science Foundation funding to expand "employment opportunities in fundamental science and engineering to meet environmental challenges and to improve global economic competitiveness;" $1.6 billion for the Department of Energy's Office of Science, for research in climate science, biofuels, high-energy physics, nuclear physics and fusion energy sciences; and $400 million for the Advanced Research Project Agency-Energy (ARPA-E) "to support high-risk, high-payoff research into energy sources and energy efficiency in collaboration with industry," according to House Speaker Nancy Pelosi.

Beyond the research, there are bricks and mortar, billions of dollars for more traditional, "shovel-ready" infrastructure projects (roads, bridges, highways and transit systems, clean

ENGINEERING GETS STIMULATED

See exactly what's coming to all facets of the engineering industry



water, environmental restoration and flood control). But even that spending will require engineering innovation.

"You don't build bridges the same way you did before," Phillips said, "and the challenge of building those new bridges provides for new research."

CHARGING THE ECONOMY'S BATTERIES

Shirley Meng speaks with both joy and dismay when she talks about the nation's move to more energy-efficient cars. Joy at the prospect of an increased market for high-performance batteries, her area of expertise as director for the Laboratory for Energy Storage and Conservation in the UF College of Engineering. Dismay at the fact that innovations aren't coming as fast the nation needs, and carmakers are turning to other countries to buy batteries for new hybrid auto products.

"In the short term, if the plan is to increase energy efficiency, there are a lot of new technologies that need to be deployed," said Meng, an assistant professor in the College's Department of Materials Science & Engineering. As an example, she mentions that GM has chosen to use an LG Chem battery for its new electro-hybrids, a product whose core is manufactured in South Korea. The ailing automaker chose the product, in part, because its development was heavily subsidized and supported by the Korean government, giving the manufacturer stability and longevity. (The other major innovator and manufacturer in the auto-battery market is Japan.)

Meng is working to double the energy density of lithium-ion batteries (like those found in laptops or cell phones) to make them safe and powerful enough to run cars by developing new battery-cell materials, through experimentation and computer modeling. She hopes that U.S. innovations in battery-storage capability not only result in job creation here but also lower pollution and save money for daily commuters.

"The idea is basically that 90 percent of the U.S. population commutes less than 30 miles every day, so if a car could drive only on electricity, can we develop a battery that will work for that?" she said. "Even if we get electricity from the grid, on the wall, it is still going to be more energy-efficient and give out far less CO_2 [than petroleum-based engines use]."

The economic stimulus plan calls for $2 billion in spending in the Advanced Battery Loan Guarantee and Grants Program, supporting "U.S. manufacturers of advanced

vehicle batteries and battery systems [because] America should lead the world in transforming the way automobiles are powered." It also gives families a tax credit of up to $7,500 for purchasing a plug-in hybrid vehicle, hoping to boost the market for hybrids and "spur the next generation of American cars."

Economics 101: Stronger markets for goods = more jobs to design and manufacture those goods.

"I tell my students," Meng said, "they are getting ready to catch the wave when the economy recovers."

ENGINEERING NEW POWER

UF engineers are also poised to play a role in another part of the stimulus plan: President Obama's desire to create a new power grid, one that can not only better handle existing energy producers but accommodate and encourage emerging technologies and renewable resources.

The College is already at the forefront of alternative energy, as leader of the $50 million Florida Energy Systems Consortium, a research project of all 11 state universities led by Timothy Anderson, a UF chemical engineering professor and former associate dean for research and graduate programs. That effort is doing for the state of Florida what the stimulus plan wants to do for all of the nation: figure out a way to incorporate new power technologies into a grid that is today only set up for oil, coal and nuclear-produced electricity. In Florida, that means solar and biomass.

"It is a perfect marriage with Obama's vision for energy in the future," said Erik Sander, the College of Engineering's director of industry programs and the industrial arm of the consortium.

On top of the $120 billion being spent on infrastructure and science, the stimulus legislation appropriates another $37.5 billion for energy research and infrastructure, the largest part going to create a renewable-energy-friendly "Smart Grid" for the nation's electrical distribution. That money breaks down this way:

- $11 billion for a "reliable, efficient electricity grid" created through research and development, pilot projects, and federal matching funds for the Smart Grid Investment Program.
- $6 billion for renewable energy power projects.
- $4.5 billion to increase energy efficiency and conservation in federal buildings.
- $6.3 billion in local government grants for energy-efficient projects that reduce carbon emissions.
- $4 billion for green-retrofitting HUD-sponsored low-income housing.
- $2.5 billion for "energy efficiency and renewable energy research, development, demonstration, and deployment activities to foster energy independence, reduce carbon emissions, and cut utility bills. Funds are awarded on a competitive basis to universities, companies, and national laboratories."

"We have tremendous opportunities not only for research in those areas but implementation," Sander said. "We have twice the solar insolation as Germany, which is the No. 1 photovoltaic country in the world. We are perfectly set up not only to find new renewable energy systems but to set them up." Some campuses in the consortium, for instance, are already testing an off-grid, zero-emissions home.

Spending money on this kind of research shows a depth of economic stimulus not always found in government job-creation plans.

"The impetus of the stimulus package is to start some more economic activity [with immediate construction projects]; engaging the researchers and the technology is a long-term approach," said Mark Jamison, a University of Florida economist and director of the UF Public Utility Research Center. "The fact that it is pointed toward [renewable energy projects] shows that the president is trying to address some short-term problems while making improvements for the long term as well."

SHOVEL-READY

For civil, industrial and environmental engineers, the stimulus plan has plenty to offer, too.

"Anything that an engineer creates from some kind of raw piece of ground is a way to create jobs," said Ray Bradick, the chairman and CEO of Bowyer Singleton & Associates Inc., an Orlando-based civil engineering firm. "When we're not working, a lot of people are out of work. We're generally the first to see it [decline], and we're the first to feel it when the recovery starts. We've been slow for a year and a half."

The focus of the economic plan reflects the stimulus value of quick spending on civil projects. For every dollar spent on public infrastructure, the nation's gross domestic product is boosted by $1.59, according to an analysis by Moody's chief economist Mark Zandi. "...And there is little doubt that the nation has underinvested in infrastructure for some time," Zandi added, "to the increasing detriment of the nation's long-term growth prospects."

> The use of engineering and technology to solve global problems will become the focus for the coming decade.

By a White House analysis, the largest number of jobs created by the stimulus plan would be in the energy and infrastructure-related industries: 836,000 new employees by the end of 2010.

UF College of Engineering researchers are already involved in almost every aspect of those industries. In 2008, the UF College of Engineering did $58 million worth of research for the federal government, part of $106 million in total research expenditures that includes funding from state and industry sources, as well.

And the plan's split between traditional infrastructure spending and nontraditional technology improvements echoes the College of Engineering's scope and mission.

"We have 11 departments and cover everything from nuclear to info technology," said David Norton, the College's associate dean for research and graduate programs and a Materials Science & Engineering professor. "Each of those areas is going to be impacted by what is being put forward in science and technology. It's good for the country, because that is where the economic growth should be directed."

Engineers, however, should leverage this opportunity for growth and innovation in the United States into the larger, global view, the College's dean reminds us.

"I regard the stimulus as a short-term investment of money," Khargonekar said. "It is focused on some of the right things. To that extent, of course, engineering does have a significant role.

"In the long-term, [however,] stimulus money disappears after a few years," he added. "We must use this economic debacle to focus what engineering and technology can do to allow our children to live in a sustainable world. Each region of the world is going to have its own challenges over the next few years: Europe its own, China, India and so forth. Competition will be global. The use of engineering and technology to solve global problems will become the focus for the coming decade."

For engineers to achieve that world-changing goal, the U.S. stimulus plan isn't an end game. It's just the start. ▫

STRAN*than* FRIC

by **KIM WILMATH**

In an underground lab filled with whizzing machines and millions of dollars worth of projects, a group of engineers work to uncover the ins and outs of friction, a study known as "**TRIBOLOGY.**" And leading the team is a young professor whose passion for the research fuels the whole operation.

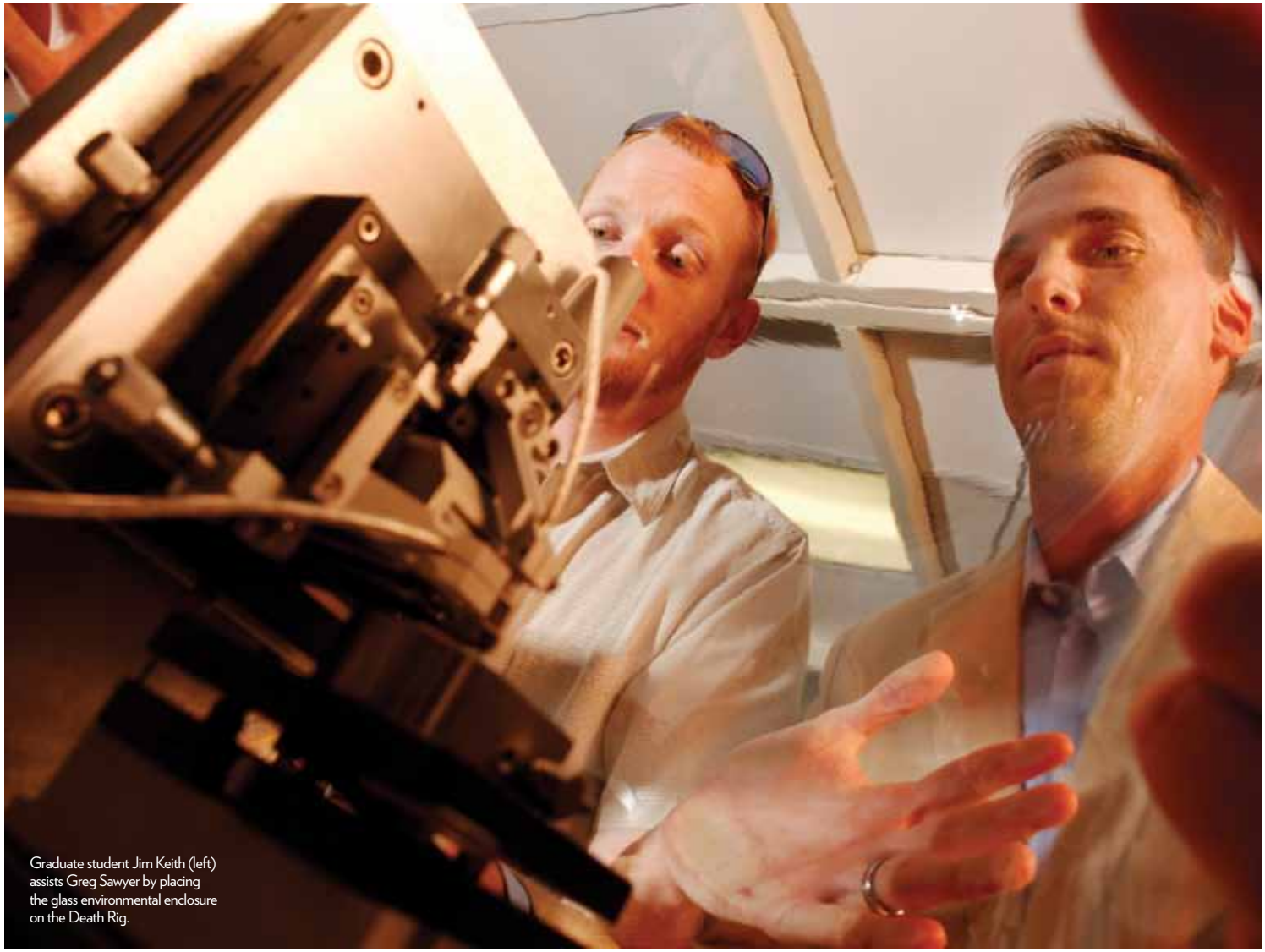
GER TION

UNDER HIS DESK, there's a pet boa constrictor named Isabel. On top of it, a bag of Hershey's Kisses and a lava lamp. There are four computer monitors visible from his office door and a dartboard hanging behind it. A bobblehead of his likeness smiles a wobbly grin under its tiny Mohawk — a tribute to the hairstyle he sported upon gaining tenure a few years back.

And on the edge of his seat, tapping a sharp yellow pencil, UF mechanical engineering professor Greg Sawyer is talking about his life's work, the study of friction and lubrication.

"You get in and see things moving and happening — events are happening with such complexity. It's like science fiction," Sawyer said. "Every time you look, you see something beautiful."

Sawyer specializes in something called "tribology." Put simply, it's the study of how stuff wears down when it rubs against other stuff. Think of a bicycle skidding pavement, a satellite extending its arms, a pen etching loose-leaf or a replacement knee squirming inside a leg.



Graduate student Jim Keith (left) assists Greg Sawyer by placing the glass environmental enclosure on the Death Rig.

Though he'd never admit it, Sawyer is the heart behind UF's Tribology Laboratory, a place teeming with machines and projects and budding geniuses. Sawyer and his troupe of students experiment with lots of solid lubricants attempting to lessen friction's wear and tear.

"**WE'RE VERY GOOD** AT **WHAT WE DO**. YOU'RE AFFORDED OPPORTUNITIES BY BEING GOOD, AND THAT'S WHAT HAPPENED TO US A LITTLE BIT," HE SAID. "**WE'RE JUST ADDICTED TO THE SCIENCE**."

David Norton, associate dean for research and graduate programs, said, "Greg is one of the most enthusiastic, interesting persons in the College of Engineering faculty. You should ask him about the Mohawk."

Sawyer's lab brings in more than a million dollars each year in grants for specific projects or basic research. Most of the money comes from the government, about 70 percent, and the rest comes from private companies who want UF researchers to develop some specific solid lubricant or refine one of their machines. Many projects take several years to complete.

UF provides the space and electricity to run the lab, but as far as paying for machines, materials or software, "We have to fund our own addictions," Sawyer said.

The University has patents pending on about half a dozen solid lubricants developed by the engineers that are now used inside different types of engines. The solid lubricants are called "composite polymers," and are created when a known solid lubricant, like Teflon, is mixed with another substance to make it stronger.

One of the composites, created by former UF grad student David Burris, was patented last year. Though some companies have expressed interest in his polymer, he doesn't think it's being widely used yet. It'll take some time, Burris said, and UF's current students continue to test and tinker with it.

The UF lab isn't the only one like it in the country, but not all academic labs are so aggressively sought after by both government sources and private industries, Sawyer said.

"It's safe to say the University of Florida has leadership in this area (tribology)," he said. "There's a synergy between us chasing our own crazy

PREVIOUS SPREAD: DAVID MUIR; THIS PAGE: TIM HUSSIN

ideas and a national lab recruiting us to chase some of its crazy ideas."

Sawyer, a man who admittedly hates being interviewed, diverts all praise to the students who work for him. He says it's their imagination that fuels the lab's success (they all cite Sawyer as the energy behind the place).

"The students pull us along. I don't think we need to push them," Sawyer said. "I let them just go with it."

And do they ever.

Right now, there are about 20 tribology ventures in progress — about eight of them considered "major projects," said Dan Dickrell, a post-doctoral staff scientist who's worked with Sawyer for almost a decade. The projects range from big to microscopic, earthly to cosmic. They're commissioned by federal agencies or born of plain curiosity. Some examples include: the study of wear on electrical mechanisms, friction on biological materials, testing high-temperature vapor lubrications, creation of new solid lubricants and studying solid lubricants in space.

Sawyer said the team won't be able to take on much else for a while, but nobody minds.

"We're very good at what we do. You're afforded opportunities by being good, and that's what happened to us a little bit," he said. "We're just addicted to the science."

Downstairs in the lab, tiny bristles stroke a copper wheel, zinging with electricity while Nick Argibay, a third-year mechanical engineering graduate student, keeps watch. He's working on research for the U.S. Navy, trying to ease friction in electrical engines to increase the efficiency of submarines or other vessels.

Argibay's not quite sure what he can or can't say about some of the projects. The top-secret-ness of it all hangs omniscient.

But what he can say is work's been under way for a couple years thanks to half-a-million dollars in equipment that Argibay assembled into his own tribometer, a friction-testing device.

"It doesn't get better than this," Argibay said.

Brandon Krick, a second-year grad student, has been working with the U.S. Air Force and NASA to send another tribometer into space. He's testing four different lubricants for satellites, planet rovers or anything else with moving parts in the harsh outer-worldly environment.

Krick is part of a project in the lab that was given about $2.5 million dollars from the government over the past couple years. The value of using NASA equipment and the launch itself isn't quantifiable, Sawyer said. "I don't know how you put a price on that."

"This is something they [U.S. Air Force developers] really need," he said. "And we're the group that's been entrusted to deliver on that."

Much closer to earth life is the work of Dickrell, the staff scientist. His research focuses on biotribology — friction on human cells. Dickrell's study of contact lens solid lubricants caught the attention of Alcon Laboratories, an eye-care pharmaceutical company that's now financing the project.

Dickrell said Alcon has already given him a couple hundred thousand dollars, and the project will likely continue for another year or two. The goal is to pinpoint the best lens solution for reducing eye irritation. For each of about 25 formulas, he carefully rubs a solution-treated contact against a layer of human eye cells grown by UF's Pruitt Family Department of Biomedical Engineering.

To replicate a contact's light touch, Dickrell must use surgical precision and a tiny lens sample. If the sample is too big, it could throw off the accuracy. Too much friction, and cells in the path will die.

These days, Dickrell hardly kills anything. It's good because it means the solid lubricants and his carefulness are improving. But death paints a pretty clear picture, and Dickrell must now look much closer to find and reduce cell injury.

"There's a story in there to be told in there. We just have to figure out what it is," Dickrell said.

With as much time as Sawyer and the students have spent watching friction wear materials, they began to wonder, "why?"

They wanted to know what happens when stuff rubs against other stuff at the atomic level. With that question answered, maybe friction wear could be prevented. Maybe some things — engines and replacement knees and all the rest of it — would never break down.

Sawyer recruited first-year graduate student Ira Hill to check it out. Hill built a complex tribometer, named "The Death Rig," to examine the wear on individual atoms.

The team hasn't gotten any grants for the work yet, but Hill said Sawyer's hoping nonprofit organizations or private companies will take notice once the research begins.

"A lot of people would love to do this, but as a company, it's not practical," Hill said. "As an academic institution, we just want to get answers."

It's not cheap. Hill built his machine from scratch so he doesn't know exactly how much it's worth. But to give an idea, one tiny part — likely the most expensive one — cost $50,000.

Sawyer said he mostly expects Hill's research to just scratch the surface. "It's really puzzling, what the origins of friction are, and the more you learn, the more puzzled you get," Sawyer said.

But it won't stop the group from wondering, testing and going back for more. And the students say they couldn't ask for a better teacher.

Said Argibay, "Greg has a tendency to take students, show them why something's important and give them a sandbox to play in."

Added Hill, "He gives you your own responsibility to make your own decisions and make mistakes."

And from Dickrell, "We've busted our tails."

In an underground lab below screeching bike wheels and hovering satellites, Argibay will fiddle with copper filaments, Krick will wait for blast off, Dickrell will caress tiny lenses and Hill will ponder the unseen.

And there, tapping a sharp yellow pencil, cooing at Isabel and brainstorming, will be Sawyer. He says he'll stick to tribology the rest of his life.

"They'll probably cart my cold, dead carcass out of here." □

SLIDING TO SUCCESS: A SAMPLING OF THE LAB'S PAST PROJECTS

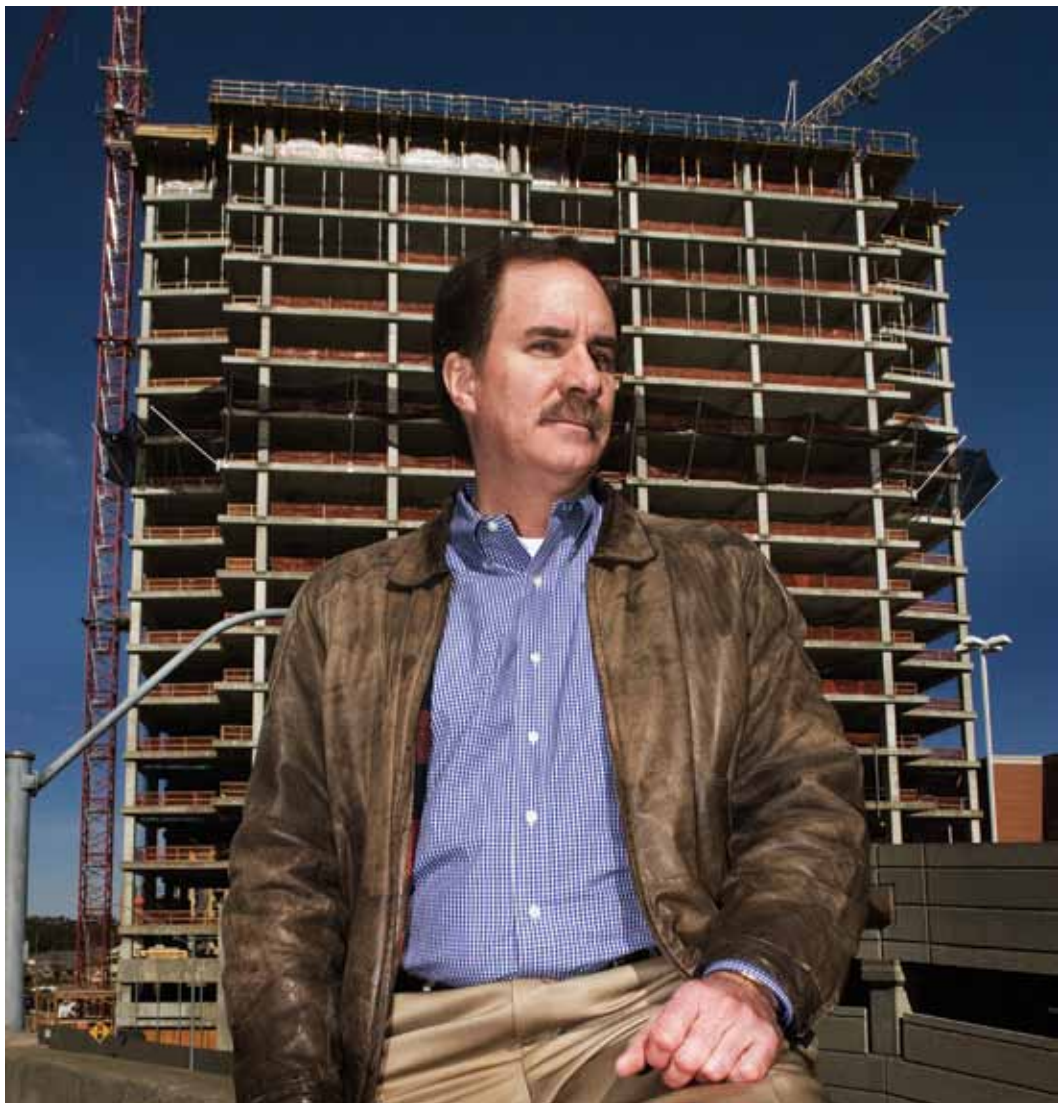
FRICTION ON THE FARM: Sawyer's team built a machine to test abrasives like sand, wheat or rice hulls against metallic surfaces — recreating an agricultural environment for the makers of John Deere equipment.

KNEE-JERK REACTIONS: Students studied knee-joint replacements to figure out how long they would last and ways to make them last longer.

UNDER-THE-SEA TRIBOLOGY: The researchers tested different materials in underwater, high-salt environments to find ways to cut down on the wear of submarines or other underwater devices.

OUT OF THIS WORLD: The group discovered ways to decrease friction on devices sent into space by replicating an out-of-earth environment. They plan to send some samples into orbit to be tested.

MINI MOLDS: The lab developed a technology for making molds with tiny features (smaller than human hairs) on new technologies, like smaller and more powerful batteries.



YVONNE BOYD

1981

MIKE HARDIN

As a Gator Engineer who actually lays the foundation for the Gator Nation, he works even harder to ensure the cornerstone of his world isn't compromised. BY MARILEE GRIFFIN

There are 300 people on Mike Hardin's mind.

Those 300 people make his company, Harcon Inc., a leading structural concrete formwork company that makes structural frames for hospitals, hotels, condominiums, parking decks, schools and stadiums across multiple states.

The 300 represent what Hardin, and thus Harcon, values most: safety. From monthly inspections, weekly OSHA training sessions and mandatory fall arrest systems that tie off all employees in high-risk situations, Harcon goes far beyond Occupational Safety & Health Administration requirements. As a result, Harcon has received awards for safety since 2002.

And Hardin says it all started for the wrong reasons.

It began as a quest for lower insurance premiums. But when they resolved to go an entire year without any accidents, the atmosphere changed for the better.

"When you really care about people, they realize it," Hardin said.

Today, the company's mindset is: *what if this employee couldn't go home to his wife and kids tonight because of an accident?*

"It also falls in line with my religious beliefs about caring for your neighbor," Hardin said. "My closest neighbors at work are my employees."

Hardin is a fifth-generation engineer and a Gainesville native. His high school created a drafting class for him. He was the only student enrolled in it. When he graduated from UF with a civil degree in 1981, he received 11 job offers.

"There are not many schools in the Southeast that have the same reputation as Florida," he said. "I've always been proud to say I'm a graduate."

When he founded Harcon Inc. in 1989, Hardin worked out of his house and had two employees. The Atlanta-based company grew by 55 percent for the first eight years and has employed more than 575 people. As the company grew, so did its scope — from supplying labor and materials for small projects to becoming a specialized subcontractor in cast-in-place concrete buildings. Essentially, Harcon makes reusable molds to form structural skeletons of concrete buildings, from hi-rise offices to churches.

Harcon has contributed to several Gainesville landmarks, such as the Butterfly Rainforest, the 34th Street Hilton, the Cancer Genetics towers, and the near-complete Cancer Research Center.

"I love coming back to check on the work we have going on in Gainesville," Hardin said. "I get to eat at Leonardo's, see my dad and buy some memorabilia at the bookstore."

Harcon has evolved into a company that embraces safety and ingenuity. Hardin inspires a culture of productivity by rewarding any employee who finds a way to do something better, faster or cheaper. Each great idea is worth $50 and a place in the "Productivity Manual." The manual is a compilation of noteworthy ideas from employees and contains a weekly letter about productivity from Hardin.

One employee found a way to remove one worker from every crew — literally saving the company hundreds of thousands of dollars.

"I told the guy, 'I'm embarrassed to give you $50,'" said Hardin, who instead gave him $1,000 and a week's paid vacation.

"Some people come up with the most amazing ideas," Hardin said. "I just wanted to show everybody how valuable their ideas can be, even if they don't think they're valuable."

ALUMNI BY YEAR

1958

Millard "Mel" Reed Everhart, B.S. ECE
lived in Flavet with his wife and two children while at UF. After working in the aerospace industry for about 10 years, they purchased Key Packaging Co., in Sarasota, Fla. The business thermoformed custom-designed plastic containers for the medical and electronic industries. Companies included Motorola, Procter & Gamble, Johnson & Johnson, etc. He and his wife also lived on their sailboat for several years. He is a member of Tau Beta Pi, works with Habitat for Humanity in Orlando and enjoys construction mission trips to foreign countries. He and his wife, Sue, are active in the church and plan to spend the next few years helping build a community for trauma and abuse survivors.

1960

Roger DeVore, B.S. CCE
is still working full time at 72 as a senior project manager for Janssen & Spaans in Columbus, Ind. His health is good, he has four grandkids and one great grandkid. He and his wife have been married for 50 years. "It's GREAT to be a Florida Gator."

1961

Karl Wiedamann, B.S. MAE
retired from Procter & Gamble in 1994. He keeps busy with competitive swimming. He was a member of the UF swim team from '56 to '60. This past year, he trained for the FINA World Masters Championships held in Perth, Australia, in April 2008. The training paid off; he won the 50, 100 and 200 meter breaststroke in the 70-74 age group. He set world records in each event.

1968

Rufus J. Frazier Jr., B.S. MAE
was married July 20, 1968, and has two children, both UF graduates: Rufus Frazier III, computer engineering, and Theresa Frazier, business administration. He entered the U.S. Air Force Pilot Training in November 1968, in the same class as George W. Bush. George H. W. Bush gave the graduation address in November 1969. He served 22 years in the Air Force as an instructor pilot, fighter pilot and engineer. As an engineer, he worked on several new aircraft and weapon systems, including Air Force One and the second generation stealth fighter. He retired as lieutenant colonel in 1990. He moved to Key West to fish and got a job with Monroe County Public Works. He worked and/or managed special projects in safety, engineering, fleet management, roads, bridges and emergency management. He retired for good in March 2004 and built a retirement home in Melbourne, Fla.

"I couldn't find an entertainment center with a door that closed (wife's requirement) for my 73-inch HDTV, so I built one," he said. "I wasn't previously interested in woodworking, but I am now. My entertainment center was my first piece of furniture (It cost $15,000 but $10,000 was for tools, which I still have). It's 16 feet wide and 7 feet high, weighs 1,300 pounds, is one piece on 19 casters and has a remote-controlled tambour door." Frazier's woodworking hobby has also led him to build two ceiling-high bookshelves, a train play table for his grandson and diploma frames. He also builds computers in his spare time.

1969

Jose M. Otero, B.S. ISE
retired in July 2008 after 32 years at IBM. He celebrated his 39th wedding anniversary in December. His son, daughter and their respective spouses all received bachelor and graduate degrees from UF. He has five grandchildren.

1970

Bob Timberlake, B.S. ECE
was part of Florida Power Corp. co-op program and worked in a variety of departments, gaining broad exposure to company operations. He began his company in 1979, which developed and marketed software for utility-rate design and analysis. In the early 1980s, this morphed into a company that developing software for a variety of businesses in the Tampa Bay area, including hospitals, medical clinics, manufacturers, fire departments, police departments, ambulance services, etc. In 1987, with the addition of two partners who were previously fire chiefs, EAI Systems Inc. became the number two provider of public safety emergency dispatch software in the country. The company was sold to Bell Atlantic in 1992. One of his previous partners started the PODS portable moving and storage business in Clearwater in 1988, and needed some good software to build the business after beginning to franchise nationwide. Timberlake helped him out parttime until 2002, when Timberlake became his CIO. He worked fulltime as the business expanded nationwide, then into Canada and Australia. Recently, the business sold to a private equity group, and he began his second retirement in March 2008.

1979

Burton L. Streicher, P.E., M.E. CCE
works as a research analyst for the Center for Naval Analyses in Alexandria, Va., conducting research in support of the U.S. Navy and Marine Corps for infrastructure and readiness. He and his family have lived in the Washington, D.C., area since 1991, after returning from Yokosuka, Japan, when he retired as a U.S. Navy captain.

1980

G.W. "Casey" Jones, P.E., B.S CCE
works with Florida Department of Children as a project manager for construction of new mental health facilities and repair/upgrade projects on existing facilities. He also monitors the operation and maintenance of privatized mental health facility and physical plants. In 2002, he retired as a Commander from the U.S. Navy Reserves, Civil Engineer Corps. He received a Davis Productivity Award as part of a twomember team resolving issues involving two unique "finance-design-build" contracts, saving the Department of Children and Families $64,343,060 in project funding. Though, he still manages to play softball in Tallahassee's senior league (55 and older) and goes boating with his wife, Jolie, on his 1983 Regal cabin cruiser, "LocoMotive."

1981

Antonio Beltran, M.E. CCE
has served as dean of the College of Engineering, where he founded the graduate division, and was interim Provost of the Catholic University of Guayaquil. As dean, he brought several groups of students to UF, lectured on soil mechanics and ethics in civil engineering and was honored with a UF Distinguished Service Award. He is founder and president of PuntOmega Consulting Group, supervising $50 million civil engineering projects and providing innovative academic and professional training overseas — including two seminars partnered with CISE. Since 1997, he has been an interviewer on a national TV program focusing on development issues. He has also served as acting congressman (nonpartisan) in the Ecuadorian Congress, Guayaquil Chamber of Construction CEO, and acting vice president and secretary general of the Ecuadorian Federation of Construction Chambers.

Julius Ward Hunter Jr., B.S. ABE
works at Parsons Brinckerhoff in construction engineering and inspection for road and bridge

1967

Manny Fernandez, B.S. ECE, Receives University's Distinguished Alumnus Award

The Distinguished Alumnus Award was presented to Manny Fernandez for 2008. The award is bestowed annually on an alumnus who excels in his or her field and performs outstanding service for the University. Fernandez was 16 when he arrived at UF and moved to Silicon Valley shortly after graduating. He built a successful career in the infancy of the computer industry, beginning with his position as CEO of Zilog, an early competitor of Intel. In 1982, he founded Gavilan — the company behind first laptop computer. Eventually, Fernandez became the CEO of Gartner Inc. and later co-founded a venture capital affiliate, SI Ventures, which focuses on information technology. He served as a member of the UF Board of Trustees from 2001 to 2007, and committed more than $1 million to UF — both as the head of Gartner and personally.

COLLEGE OF ENGINEERING / INIGO DE AMESCUA

projects. He was elected secretary of the Big Bend Chapter of the Florida Engineering Society. His daughter graduated from UF with a degree in agricultural and biological engineering and moved to Atlanta with her fiancé, who is a UF electrical engineering graduate. His son received his electrical engineering degree from UF in December 2008.

1981

Mark Pedersen, B.S. EES
is area environ manager for Republic Services Inc.

Benjamin B. Price, B.S. ECE
is a facilities engineer at GE Global Research in Niskayuna, N.Y.

1984

Daniel N. Hlaing, B.S. EES, M.E. EES '96
works for an environmental engineering consulting firm assisting clients with air quality permitting and compliance, including dispersion modeling studies and data management. He is married and says someday they may adopt a child.

Karen Neukamm, B.S. MAE
changed her career from mechanical engineering to teaching middle school pre-algebra, algebra 1 standard, and algebra 1 honors. She is also teaching geometry for gifted students. She was named "Teacher of the Week" in November/December 2007 by the Orlando Sentinel. All three of her children are attending UF: one is an architect, one is a ceramics major and one is studying pediatric physical therapy.

Frank Mauricio Travassos, B.S. MAE
is the Director of Program Integration for United Space Alliance at the Kennedy Space Center. As a member of the Space Program for more than 23 years, he's worked in design, development and testing of cryogenic propulsion systems. In addition, he has significant experience in system engineering and integration operation on the Space Shuttle Program. He's been married to his wife Doris, also a UF alumnus, for 28 years. As the first member of his family to graduate from college, his greatest achievement is seeing his children graduate from UF: Rebecca, '04 B.A. Sociology, and Greg, '08 B.S. EE.

1985

Jose R Diaz, B.S. CISE
is working on his third startup company — technology and computers applied to advertising. He first sold Apple-based systems to ad agencies, newspapers, magazines, etc. He then started large-format digital printing services for billboards. In 2005, he started a digital signage company with his wife, Karina, who is a creative designer. He takes care of the technical and sales side of the business and Karina does all the creative work. They won the 2006 DIGI Award for the best digital signage installation in retail. Their 14-year-old son, Stefano, is a two handicap in golf and was selected by Computer Associates (CA) and the First Tee Program to be a oncourse reporter during the Calif. Championships in Doral.

1986

Eric Gies, B.S. ISE
works for Neuberger Berman, a wealth management business. He lives in Rye, N.Y., and commutes into the city by train (a first for this Florida boy). He's been married for more than 18 years to K.C. and has four children: Sarah, 11, Katie, 8, Stephen, 6, and Tommy, 3.

Jack Matthews, M.E. CCE
is a senior engineer at Carlton Engineering, Inc in Shingle Springs, Calif.

1987

Brian J. DuChene, P.E., B.S. MSE
recently celebrated his 20th anniversary with the same firm since graduating from the MSE department. He was named senior principal engineer, which is the highest technical position one can achieve in his firm. He runs the facilities consulting group in the Orlando office, which includes building science, indoor environmental quality and roofing/waterproofing consulting services.

1989

Betty J. Greene, B.S. MAE
is a senior engineer at Dynetics Inc. in Huntsville, Ala., and is very active in the Rocket City Gator Club.

Martin Johnson, B.S. ECE
is a senior staff systems engineer at Lockheed Martin Aeronautics in Marietta, Ga. and is working on modernization and flight test for the F22 fighter program. He retired from the Air Force reserves after 30 years of service. His sons attend Georgia Tech and N. Metro Tech.

1990

Hillary Wasserberg Harter, B.S. MSE
works for Carestream Health, Inc. (the former Kodak Health Imaging Division) as an imaging consultant providing technical support to mammography customers with regard to image quality and quality control. She has returned to school to get her registered nurse degree. Harter was married in 1996 and has two daughters, ages 7 and 10.

1991

Valeri (Alexander) Bishop, B.S. ISE
works for Motorola.

Michael Collins, B.S. MAE
was commissioned in the U.S. Air Force the day prior to graduation, so any job directly associated with engineering was put on hold. However, the engineering skills learned at UF have helped him throughout his career. He graduated at the top of his class from Undergraduate Navigator Training at Mather AFB in Sacramento, Calif. and was a crew member on the KC135 ever since — with active

1966

Thomas Furman Jr. Retires as CEO of CDM

B.S. CCE '66, M.E. CCE '67

APRIL 1951 Thomas D. Furman Sr. joins UF as an assistant professor of civil engineering and assistant research professor.

1966 Furman Sr. is one of the founding faculty members of the Department of Environmental Engineering Sciences at UF. His son, Thomas D. Furman Jr., earns his bachelor's degree in civil engineering from UF.

1967 Furman Jr. earns a master's degree in civil engineering from UF.

1973 After military service and three years with Smith Davis & Associates, he joins Ross, Saarinen, Bolton and Wilder as a vice president.

1974 The firm merges with CDM, a consulting, engineering, construction and operations firm headquartered in Cambridge, Mass. CDM currently has 4,000 employees in more than 100 offices worldwide.

1977 Furman is named Young Engineer of the Year by the Florida Engineering Society.

1980 Furman Sr. retires from UF as Professor Emeritus.

1986 Furman completes the Harvard Advanced Management Program.

1987 He is promoted to executive vice president and named to the Board of Directors.

1991 Furman becomes president of CDM.

1998 Furman becomes chief executive officer. Revenues were at $395 million; now, they are more than $1 billion.

1999 Furman becomes chairman of the board.

MARCH 27, 2008 Furman Sr. passes away at his home in Table Rock, S.C.

APRIL 8, 2008 Furman Jr. announces he will retire at the end of 2008.

DEC. 6, 2008 CDM establishes The Thomas D. Furman Jr. Excellence Fund in Environmental Engineering to honor his retirement. The $50,000 endowment is unrestricted, meaning it can support a variety of needs in the department — from research projects to lab equipment.

APRIL 23, 2009 Furman will also be presented with the American Society of Civil Engineers' 2009 Outstanding Projects and Leaders Lifetime Achievement Award in management.

duty for seven years and the past nine with the Utah Air National Guard. The greatest skill he says he learned at UF was problem-solving: "...engineers, we solve everything". He, his wife and four boys live in Ogden, Utah where he is the air refueling subject matter expert for the USAF. The job has little to do with aerospace engineering, but everything to do, once again, with problem solving. His Air National Guard unit deployed this summer, which he said helps him appreciate his comfortable life at home as he read from Alligator.org at work or catches up on the latest Gator Spring practice news.

1992

F. Craig Loper, B.S. MSE
works for J&J Vision Care 3GT Advanced Technologies as a technical leadership engineer for new product qualifications, ramp-up, process and quality improvements. He also became the product increased output lead and is included in Ireland ramp-ups. He recently received a Leadership Award for two multimillion dollar cost deferment projects with product re-qualifications and technology advancements.

Andrew Ziffer, B.S. ECE
Z Real Estate LLC was chosen as the 2008 National Apartment Association PARAGON Award Winner for 2008 in the Independent Rental Owner Category for the ownership and operation of his Atlanta apartment community, Chestnut Hill. This award is the highest honor an apartment owner/operator can receive in the industry.

1993

Deborah V. Beebe DiFrancesco, B.S. MAE
works for 3D SYSTEMS in Rock Hill, SC as the director for material programs and engineering services. She is married and has three children: Lanie, 10, Sophie, 7, and David, 4.

Martin J. Lobik, P.E., B.S. EES
is a project engineer with the Springfield Water and Sewer Commission in Springfield, Mass., where he oversees domestic and raw water installation projects servicing 250,000 people. He is married to Kathleen and has two children, Liam and Erin.

1994

Wm. Mark Jennings, M.S. EES
teaches biology at Taylor County High School. He was recognized as one of the top 25 percent of secondary teachers in the state. His only child, Amanda, is a senior at TCHS and will pursue an advertising art degree at the Savannah College of Art and Design.

1995

Danny Garcia, B.S. CCE
works for Ranger Construction, a company of the Vecellio Group— a major South Florida road building, site work, asphalt and excavation contractor operating from West Palm Beach through the Florida Keys. He was promoted to lead the newly acquired Miami branch and is charge of a team of more than 120 employees, including field and office personnel. He is married to Marisol Martinex-Garcia and has three children: Daniel, 7, Kelly, 4, and Gabriella, 1, to whom he dedicates his efforts, sacrifices and life.

Becky (Fierle) Hachenburg, B.S. EES, M.S. ISE
works for MWH, an international environmental consulting firm headquartered in Broomfield, Co. She is finishing a 4-year assignment as technical manager with the SFWMD's Everglades Restoration program and has accepted a position as office manager of the Palm Beach office.

1999

Tina (Brown) Farmer, B.S. ABE
is the child nutrition director for Cabarrus County Schools in North Carolina.

Angel Luis Torres, B.S. ECE
is managing partner at White Knight Adviser LLC.

2000

Susan M. Carstenn, Ph.D. EES
is an assistant professor of environmental science at Hawaii Pacific University on the island of Oahu. She is teaching her first graduate class on oceanographic influences on marine mammals in the Hawaiian Islands using GIS and remote sensing. She was also was appointed program coordinator for the environmental science and environmental studies programs at Hawaii Pacific University and is working on a book project with a colleague at the South Florida Water Management District.

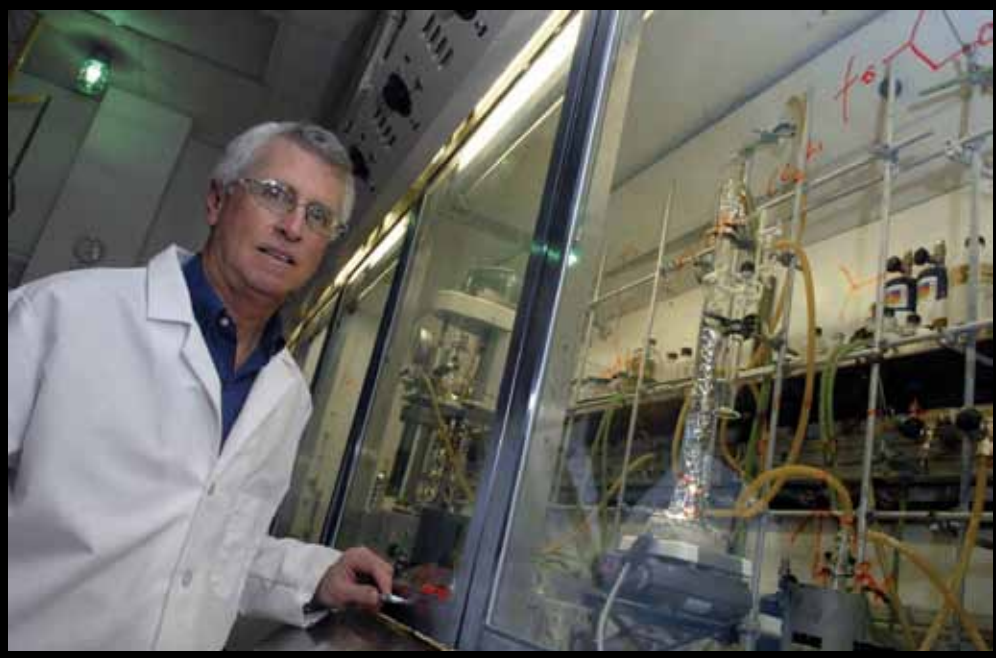
2001

Corneliu I. Chetan, M.S. CISE
works at Microsoft in the system center virtual machine manager group. He married his UF classmate right after classes on Nov. 25, in India. He says he really thanks his professors for conducting the exams early enough (by Nov 22nd), and managed to reach India 15 hours before his marriage.

2002

Christopher Daniel Fries, B.S. MSE
works at Florida Power and Light in Juno Beach, as a production assurance engineer.

Emmanuel Oman, M.S. MAE
is a lecturer at the mechanical engineering department, Accra Polytechnic, PMB, Accra where he teaches control systems, computer control of machines and processes.



COURTESY OF THE FAYETTEVILLE OBSERVER

1973

Charles Noelke, B.S. CHE

He was elected to the U.S. National Academy of Engineers for his distinguished work as part of a team that led the company's efforts to develop and commercialize the replacement process technology for chlorofluorocarbons (CFC) in refrigerants.

Noelke's election to the National Academy of Engineering is among the highest professional distinctions accorded to an engineer. Academy membership honors those who have made outstanding contributions to "engineering research, practice, or education, including, where appropriate,significant contributions to the engineering literature,"and to the "pioneering of new and developing fields of technology, making major advancements in traditional fields of engineering, or developing/implementing innovative approaches to engineering education." He is also a DuPont Fellow and Lavoisier medalist.

2002

Domenico Anthony Ruggiero, B.S. MAE
is a senior consultant with Booz Allen Hamilton. He did some undergraduate research with Dr. Haftka and also was highly involved with the Flight Test Engineering program with Dr. Walsh. Following graduation, he began full-time employment at the NASA Kennedy Space Center. Some of his duties included working with the Orbiter Structures Engineering department of United Space Alliance. In addition to participating in the Orbiter Major Modification of OV103 Discovery, his experience in the group was utilized during the STS107 Columbia Reconstruction Effort in a hangar at the Kennedy Space Center following the unfortunate loss of Columbia's crew on February 1, 2003. He is married to Sonia, and has two sons, Michael and Gabriel.

Elia Twigg, P.E., B.S. CCE
works for the City of Palm Bay as the Public Works Division Manager. She manages 75 staff members in maintenance and construction, traffic operations and customer service. Her department went through the accreditation process with American Public Works Association and will be recommended for full accreditation. They will be the 51st agency to achieve full accreditation with APWA.

2003

Robert Pittard, B.S. ISE
works for Florida Power and Light in northwest Palm Beach County. He says he is very happy with his job, wife and three children.

Kate Sablotsky, B.S. ABE, M.E. BME
works for in Ventiv Health as a pharmaceutical representative. She married a chemical engineering grad from UF, Shane Sablotsky, whom she met in calculus their sophomore year. He is a Lieutenant JG in the U.S. Navy and works as a nuclear engineer on the George H. W. Bush. They just had their first baby, Samuel, in October 2007.

2004

Ivan Mutis, M.S. CCE
is an assistant professor at the University of Southern Mississippi and was named a Rinker Scholar.

Jorge L. Weir, B.S. NRE
works in the nuclear industry on and off in Venezuela, Spain, and South Africa. He never thought it was possible to travel around the world while being able to do a nuclear engineering job, and says he owes this opportunity to obtaining a degree from one of the top university of the world: UF. "I have been able to develop as a professional engineer, always representing my university around the globe."

2005

Tim Walters, B.S. MSE
works in Huntsville, Ala., for the Marshall Space Flight Center as a materials and processes engineer for The Boeing Co., working on the development of the Ares I Upper Stage, which is a part of the flight vehicle set to replace the Space Shuttle as NASA's space flight vehicle.

2006

Dante Buckley, B.S. MAE
is an engineering graduate student, and last year he won the Florida University Satellite Design Competition.

James Van Pelt III,
B.S. MAE '05, M.S. MAE
is a composites materials engineer for Lockheed Martin Space Systems Co. working on the

100 YEARS OF GATOR ENGINEERING

The year was 1910. William H. Taft was president. A stamp cost 2 cents. And in a little town called Gainesville, the University of Florida established a College of Engineering. It had one faculty member and a handful of students. Today, Gator Engineering has nearly 500 faculty and staff members, almost 8,000 students, and more than 40,000 alumni. Throughout this year and next, we'll celebrate the College's first 100 years, as well as milestone anniversaries for several of our departments. CCE, ECE and MAE were our founding departments and celebrate their own 100-year history. ISE celebrates 75 years, and MSE and NRE celebrate 50 years. We've come a long way since 1910, and you are part of our story. Please join us during this season of celebration as we reflect on our history and look forward to our future.

UPCOMING EVENTS

OCT. 2-3, 2009
MSE 50TH Celebration
Department tours, presentations and celebration banquet

NOV. 6-7, 2009
Milestone Anniversary Celebrations for CCE, ECE, ISE, MAE and NRE
Department tours, presentations and celebration banquets

NOV. 6, 2009
Friday
College-Wide Benton Hall Historical Marker Dedication & Reception
This event will mark the site of the original Benton Hall — UF's first engineering building — which stood near where Grinter Hall is today.

NOV. 7, 2009
Saturday
Gator Engineering Tailgate Reunion
Three hours before kickoff Football Game (Florida vs. Vanderbilt) More info to come this summer to register for the weekend's events.

Watch our Web site and department Web sites for the full listing of department activities, details on celebration ticket packages, event times and locations, and information about future events.

www.eng.ufl.edu

Orion program. Orion is the vehicle that will carry the crew on Ares I to the Space Station, Moon and Mars. He lives in New Orleans and works at the Michoud Assembly facility — the NASA facility that makes the external tank for the Space Shuttle.

Marissa Shoshanah Schein, B.S. ISE
is Operations LDP at Lockheed Martin.

2007

Andrew May, B.S. ECE, M.S. ECE
works as an electrical engineering associate for RS&H in Jacksonville. He says his job provides plenty of opportunity for growth, challenge and fun and that there are mentors and trainers that take part in his work-life daily. They advise and teach on the job and in a class setting. He says when work gets busy and he is pressured to complete a project within the given deadline, all the resources UF gave him come in handy.

Edwin F. Mojena, B.S. CCE
joined Marlin Engineering in November 2006 as transportation department design manager. He was appointed assistant vice president of production responsible for transportation design, municipal services and field survey.

Vibhuti Pandey, Ph.D. ABE
works in the West Palm Beach doing water resource management.

Samuel Smith, B.S. CCE, M.E. CCE
is a structural engineer for the company RK&K. He has worked on a variety of different structural engineering tasks, including the designs of water treatment facilities and bridges. He has also inspected some of the Chesapeake Bay Bridge, which incorporates several types of structural systems, including deck truss, through truss, and suspension type spans. He and his fiancee live in Owings Mills, just outside of Baltimore. They enjoy staying active in the community and keep busy seeing some of the many historical sites in the area.

2008

Kerri Lynn Marsh, B.S. ISE, B.A. French
is a consulting analyst at Accenture in Atlanta.

Gbadebo Senu Odutola, B.S. MAE
is attending graduate school at UF and is working toward a masters degree in aerospace engineering. He hopes to graduate in May 2010.

Anthony Ominski, B.S. EES
works for Gainesville Regional Utilities supervising a water plant at the Deerhaven Generating Station.

Robert Pedicone, B.S. MSE
works with Siemens Power Generation with its engineering development program.

Alina Zare, Ph.D CISE
is working on a postdoc at UF while searching for a tenure-track faculty position. Her broad area of research is machine learning. Specifically, she is researching methods for hyperspectral image analysis with application to land mine and explosive object detection.

FACULTY UPDATES

Gator Engineering professors are nationally recognized by their peers for outstanding research and commitment to engineering.

ISE
Ravi Ahuja was elected as a Fellow of the Institute for Operations Research and Management Science for making significant contributions to the advancement of operations research and management science.

BME
Mingzhou Ding was named a fellow of the American Institute for Medical and Biological Engineering for his contributions to the development of advanced computational methods for the analysis of functional brain networks.

MSE
Martin Glicksman, a member of the NAE, was selected to receive an ASM International Honorary Membership for advancing fundamental knowledge of materials science and engineering, leading to deeper understanding and more accurate prediction of cast alloy structures, and the evolution of polycrystalline networks.

MAE
Raphael Haftka received the AIAA / ASC James Starnes Award for his pioneering work on optimization techniques for composite structures, his mentoring of countless undergraduate and graduate students, and his exemplary service to the profession.

CHE
Ranga Narayanan received an Invitational Fellowship for Senior Scientists from the Japan Society for the Promotion of Science for his outstanding research in interfacial fluid mechanics.

MSE
Simon Phillpot was elected as a Fellow of the American Physical Society for sustained contributions to developing microscopic mechanistic understanding of interfacial phenomena in materials using atomic-level simulations methods.

CHE
Fan Ren was elected to become a Fellow of the American Physical Society for contributions to the development of device processing technologies for compound semiconductor devices based on GaAs, InP, ZnO and GaN.

ECE
Dapeng Oliver Wu received an AFOSR YIP Award to fund his proposal entitled "Joint Information Theoretic and Differential Geometrical Approach to Robust Automated Target Recognition."

NSF CAREER AWARDS

The Faculty Early Career Development Program offers the National Science Foundation's most prestigious awards in support of junior faculty who exemplify the role of teacher-scholars. Gator Engineering averages three CAREER Awards a year. In 2007, we won seven awards, ranking us among the top 2 percent nationwide. Three assistant professors received CAREER awards in 2008, and four have won them so far in 2009:

2008

CHE
Peng Jiang

MSE
Jacob Jones

CISE
Prabhat Mishra

2009

ECE
Jing Guo

CISE
Tamer Kahveci

MSE
Michele Manuel

ECE
Liuqing Yang

To read about the research these awards will fund (which includes everything from using nanotechnology to create lightweight cars to improving data storage for underwater sensor networks), visit www.thefloridaengineer.eng.ufl.edu.

ENgINEER UPDATE

FLORIDA TOMORROW...

Engineering Florida's Economic Future **BY MEG HENDRYX** / Sr. Director of Development

It's not a new concept – make an investment now to see the payoffs in the future. But, given the recent financial crisis, choosing your investments will require new ways of thinking and will require new opportunities to see substantial payoff. At the UF College of Engineering, there has never been a better time to invest and arguably never a better group to invest in. The College is competitively poised to take current technologies and make them better, create new innovations and make Florida a better place to work, play and thrive personally and financially. In keeping with President Obama's leadership in creating an economic stimulus package for infrastructure and innovation, investing in UF and engineering will create new products and know-how to change the world. Not many investments can tout that concept.

Take for example, the recent philanthropic investment from Gary and Suzy Miller. The Miller's gift will support facilities and thus name the Orthopaedic Biomechanics Lab in the Department of Mechanical & Aerospace Engineering. The lab will ultimately support the work of faculty members like Scott Banks and B.J. Fregly who are dedicated to developing human musculoskeletal biomechanics, multibody dynamics, and mechanism design optimization (see page 10 to learn more about Banks' research).

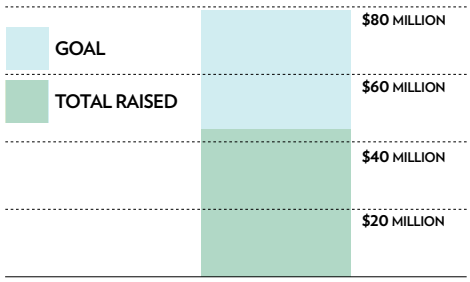
"I have known Dr. Fregly and Dr. Banks for many years, and respect all that they have done [in the area of applied orthopaedic biomechanics research]. As one of the first participants in the UF ME Biomechanics program, when I heard recently that the Department was building a new building, and that there would be space dedicated to a new biomechanics laboratory to help perpetuate this ongoing program, I saw it as a unique opportunity to give back to the University and the Department in a really meaningful way for me that will endure," Miller said.

"I hope that this investment in the Department will encourage others to do the same so that it will continue to be world class in these challenging times for academic research."

UF's Florida Tomorrow Campaign is designed to galvanize the efforts of faculty and students working to solve today's most critical issues like energy, the environment, health care and countless others. With the help of Dr. Miller and many others, we are well on our way.

CAMPAIGN SO FAR...

TOTAL GOAL: $80,000,000 **TOTAL RAISED: $43,173,279**



DOLLARS RAISED WILL BENEFIT THE FOLLOWING AREAS:
Faculty and Student Support, College-wide Programs & Research, and Campus Enhancements.

SAVE THE DATES....

MARCH 28, 2009
Department of Civil & Coastal Engineering Golf Tournament Sponsored by Civil Gators

APRIL 1-5, 2009
ANS National Student Conference Hosted by UF's American Nuclear Society Student Section conference@ans.nre.ufl.edu

APRIL 18, 2009
Chemical Engineering Alumni Open House Lunch and laboratory tours in the Chemical Engineering Building Prior to Orange & Blue Game

JULY 18, 2009
Chemical Engineering Alumni Reunion Lunch and laboratory tours in the Chemical Engineering Building Dinner and entertainment at Ti Amo! Restaurant

1935 Colbert W. Wilkins B.S. CHE Loveland, Ohio, June 20, 2008 1937 Everett H. Waychoff B.S. ME Ft. Mitchell, Ky., Nov. 29, 2007 1940 Robert Hecksher B.S. EE Ft. Myers, Fla., Nov. 4, 1999 | Edward J. Kosinszki B.S. CHE Oklahoma City, Okla., March 29, 2000 1943 Patt E. Eddings Jr. B. EE Kinsale, Va., July 22, 2008 1947 Paul H. Hardaker MSE Jacksonville, Fla., May 23, 2008 | Rex A. Roden B. CHE Orange Beach, Ala., July 24, 2007 1948 Archie W. Gordon Weirsdale, Fla., Jan. 22, 2009 | Louis J. Hausrath B. CHE Waynesboro, Va., Nov. 29, 2008 1949 James A. Hargan Sr. B. ME Tampa, Fla., Dec. 23, 2008 | John W. Mueller Jr. B. IE Miami, Fla., July 1, 2008 | James O. Polston B. ME Chamblee, Ga., Jan. 23, 2009 | George R. Register Jr. B. ME Jacksonville, Fla., Aug. 5, 2008 | David W. Wetherington B. ANE Vero Beach, Fla., May 9, 2008 1950 George R. Brockway B.S. CE Palm Beach Gardens, Fla., May 15, 2008 | Lawrence K. Gaventa B.S. ME Kingwood, Texas, Jan. 6, 2009 | Charles G. Houriet B. CHE Jacksonville, Fla., Oct. 14, 2008 | George P. Kalaf B. IE Port Charlotte, Fla., April 19, 2008 | Robert E. Owen B. EE West Palm Beach, Fla., Aug. 9, 2007 | Robert M. Winger B.S. AE Longwood, Fla., Aug. 25, 2008 1951 Dr. Jaime B. Fernandez B.S. CHE Haverford, Pa., Oct. 31, 2008 | Rich W. Owen B. CE St. Petersburg, Fla., June 29, 2006 1952 Robert M. Bellinger B.S. CHE Mesa, Ariz., July 17, 2008 | David W. Pippinger B. ME Hayesville, N.C., Aug. 15, 2005 1953 Edwin J. Hollifield Jr. B.S. CE Ormond Beach, Fla., Oct. 1, 2004 | William O. May B.S. ME Palm Harbor, Fla., April 21, 2007 1954 William Carreras B. CE Belmont, Calif., Jan. 13, 2006 | John D. Corry Sr. B.S. EE Baltimore, Md., May 27, 2008 1955 Alex B. Hull III B. EE Oviedo, Fla., July 19, 2002 | Park B. Meiter B. ME Danville, Calif., Jan. 21, 2009 | Nicholas Yanaros B.S. ME Ft. Pierce, Fla., July 24, 2008 1956 Ashford C. Greeley B. EE Greenacres, Wash., Aug. 11, 2008 | Joseph D. Morris B. CHE Dade City, Fla., Nov. 25, 2008 | James H. Starkey B. EE Cocoa Beach, Fla., Dec. 4, 2001 1957 Robert J. Arpin B.S. EE Gainesville, Fla., Dec. 19, 2002 | James R. Miller B.CE Sheboygan, Wis., Oct. 26, 2008 | Alfred R. Morse B. ME Huntsville, Ala., Nov. 18, 2008 1958 Bobby L. Henley B.S. ME Delray Beach, Fla., April 11, 2008 | Ronald E. Meade B.S. EE Ocala, Fla., July 13, 2008 | Wilmer B. Stoufer III B. CHE Jacksonville, Fla., Nov. 2, 2008 1959 Lawrence W. Aiken B. EE Weatherford, Texas, April 24, 2006 | George D. Hayes Jr. B. ME Powder Springs, Ga., Aug. 22, 2008 | Francis

L. Mannion Jr. B.S. IE Miami, Fla., June 18, 2004 1960 Robert J. Crosson B. EE Montgomery Village, Md., Aug. 8, 2008 | Ralph E. Oglesby B. EE Oxford, Fla., Jan. 31, 2009 | Fred C. Polhemus Jr. B. ME Eufaula, Ala., Aug. 7, 2008 1961 Thomas E. Adams Sr. B. ANE Jasper, Ga., Oct. 6, 2008 | Robert Lough B.S. EE Indiantown, Fla., Feb. 3, 2007 | Harlis D. Strickland B.S. EE Melbourne, Fla., Jan. 8, 2008 | Edward B. Thayer MSE Stuart, Fla., Nov. 19, 2008 | Gilbert F. Van Zandt B.S. EE Hot Springs National Park, Ark., Dec. 22, 2008 1962 G. F. Gibson Jr. B.S. EE Key West, Fla., July 17, 1995 | Dee D. Loucks Jr. B.S. IE Mustang, Okla., June 14, 2005 | Chi Yuan MSE Palo Alto, Calif., July 24, 2008 1963 Alan M. Chedester M.E. Columbia, Md., Jan. 13, 2008 | Courtland A. Collier M.E. CE Gainesville, Fla., July 17, 2008 1964 John K. Dinkins B. ME Orange Park, Fla., Aug. 25, 2008 | Bentley O. Hughes B. ME Melbourne, Fla., May 16, 2007 | M. Franklyn Jones B.S. EAG Clewiston, Fla., Nov. 26, 2004 | John J. Powell B.S. ME Dunnellon, Fla., July 20, 2008 | Curtis R. Smith B. EE Winter Park, Fla., Nov. 24, 2008 1965 Kenneth A. Roberts B. ASE Fresno, Calif., Sept. 9, 2005 1966 Rhodes F. Blair B.S. EE Anthem, Ariz., April 7, 2005 | Hal Richmond B.S. IE Quincy, Fla., Aug. 8, 2007 | John J. Woods MSE West Columbia, S.C., June 21, 2008 1967 William P. Briley Jr. M.S. Tybee Island, Ga., Sept. 24, 2008 | Jerauld L. Dickerson B.S. CHE Pensacola, Fla., Oct. 21, 2008 1968 John E. Baures B. IE July 4, 2008 1969 Daniel Arguelles B. IE Miami, Fla., May 1, 1999 | Charles J. Stone B.S. CHE Ft. Lauderdale, Fla., Nov. 12, 2003 | Clifford D. Woods MSE Perry, Ga., Oct. 2, 2008 1970 William S. Jennings M.E. Melbourne Beach, Fla., Nov. 10, 2004 | Dr. D. Dale Kleppinger Ph.D. EE South Burlington, Vt., Nov. 6, 2008 | Edward D. Mitchell B.S. EE Poway, Calif., June 30, 2004 1971 Richard V. Dzwonkiewicz B.S. IE Miami, Fla., May 15, 2008 | Dr. Lyman W. Heller Ph.D. CE Lake Placid, Fla., July 2, 2008 1972 James V. Muse B.S. IE Orange Park, Fla., Nov. 29, 2008 | Daniel H. Smalley M.S. Richboro, Pa., Oct. 1, 2008 1973 Robert B. Lang Jr. M.E. Albuquerque, N.M., April 24, 2007 1974 Richard E. Strickland M.E. Ft. Walton Beach, Fla., July 14, 2008 1975 Ray D. Odom B.S. EE Palm Bay, Fla., Feb. 1, 2009 1976 Dr. John T. Healey Ph.D. MTL Seminole, Fla., Aug. 30, 2008 | Bryan C. Willard B.S. EE El Cajon, Calif., Aug. 14, 2005 1977 John M. McBride B.S. CHE Austin, Texas, Oct. 6, 2006 | James H. Sojourner III B.S. EES Orlando, Fla., Feb. 24, 2000 1978 Dr. Clarence L. Gardner Ph.D. EE Gardena, Calif., Jan. 3, 2009 1981 Dr. James H. Dunlap Ph.D. ENE Lexington, Ky., June 9, 2008 1982 Stephen A. Means M.E. CE Panama City, Fla., Sept. 30, 2008 1983 Gary P. McCranie B.S. NES Newberry, Fla., Feb. 5, 2009 1984 Paul G. Donovan B.S. ME Orlando, Fla., Jan. 16, 2003 1985 Andrew R. Foor B.S. EE Palm Harbor, Fla., Dec. 6, 2008 1986 Steven A. Santuro B.S. EE Cape Canaveral, Fla., March 27, 2008 1987 The Hon. Stanley F. Mayfield B.S. CE Vero Beach, Fla., Sept. 30, 2008 1988 Barry T. Bennett B.S. EAE Satellite Beach, Fla., July 12, 2008 1989 Capt. David B. Gerlach B.S. EAE Nanty Glo, Pa., June 29, 2008 1991 Christian J. Aviles B.S. ISE Charlotte, N.C., May 10, 2008 1993 Dr. Coimbatore V. Iswaran Ph.D. MTL Micanopy, Fla., July 26, 2008 1996 Edward E. Carroll III M.S. MTL Gainesville, Fla., July 6, 2008 1999 Robert C. Bishop Jr. B.S. CHE Tampa, Fla., Oct. 15, 2008 2000 Christopher N. Seiffert B.S. CEN Delray Beach, Fla., Oct. 13, 2008 2002 Oscar D. Canonizado B.S. AGE Sanford, Fla., Aug. 15, 2008 2007 Michael J. Morton B.S. AE Safety Harbor, Fla., Sept. 23, 2008

ILLUSTRATION BY JOHN DUNNE

ENGINEERING FIX-ATION

Engineering helps one mom navigate the trickiness of parenthood.

No one can ever accuse me of not practicing what I preach, particularly when it comes to preaching about the marvelous, fabulous, spectacular field of engineering. Rolling your eyes yet? Well, my children are, constantly.

Whenever the opportunity arises I turn into a live-action Gator Engineering infomercial. I don't do this to purposely annoy the 12-year-old, the 6-year-old, the 5-year-old or even the 3-year-old. I do it because I genuinely think engineers are amazing.

The funny thing is, even with all the eye rolling that ensues after an infomercial special, they actually listen. My 6-year-old, Jackson, is a case in point.

It happened like this. Jackson strides into the kitchen and hands me his PlayStation 2 controller, the most coveted Christmas present received in the McKeen household.

"The boys, Mom," he said with all-knowing confidence. "They jumped on me while I was playing and the wires popped out. I think it's broken."

I stop and turn, fully-attentive and surprised at his calm. He is 6, after all, the age when the wrong drinking cup can turn into a Naomi Campbell-worthy meltdown. But Jackson is calm, collected, even rational.

"Yeah, buddy," I say. "We can't get a new one right now. They're pretty expensive. Maybe for your birthday."

He looks at me as if I am wearing a dunce cap.

"The engineers, Mom. Can't you just take it to work and they can fix it? You said the engineers can do anything."

Damn! I was played by a 6-year-old and he just beat me at my own game.

But the fact of the matter is, he's right.

As we look around our lives and see friends, family, neighbors, colleagues, even our alma mater trying to stay afloat during these economically challenged days, promise and possibilities abound — especially for engineering.

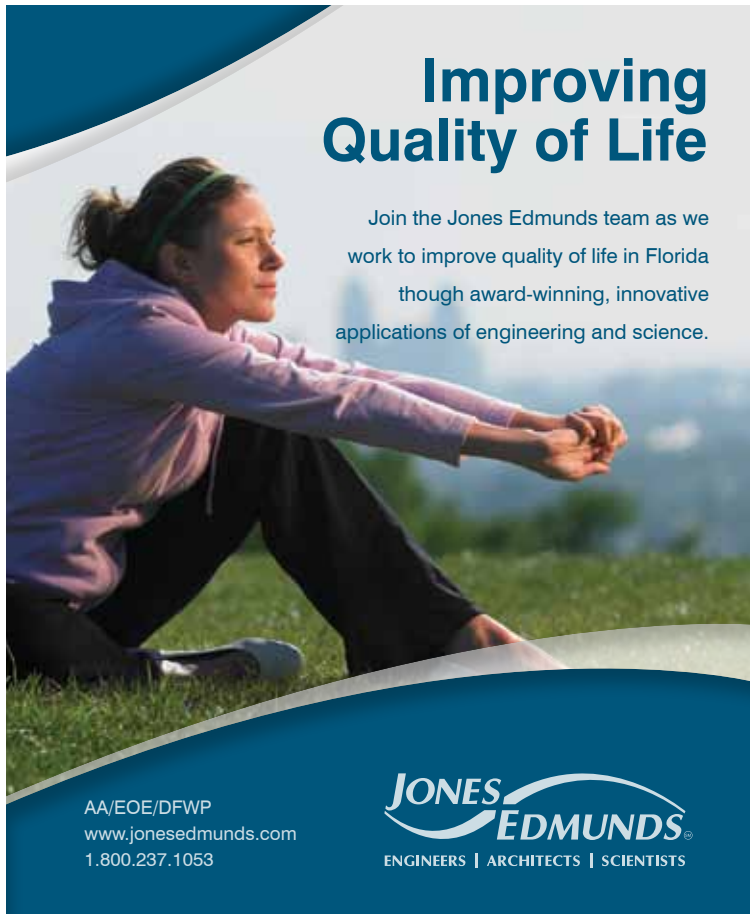
In "Economic Rehab," there's a $179 billion show of faith in engineering as an economic savior. "Stranger than Friction," "It's Complicated," and "Getting Centered" all show the College's commitment to and strength in research. In "Truth be Told" we see an industry more broadly than ever open to creative problem solving.

But the most telling example in the strength and promise in the future of engineering comes exactly where it should, from the confident words of a 6-year-old boy — "'engineers can do anything."

Sincerely,

Nicole C. McKeen

Nicole Cisneros McKeen
Editor
nmckeen@eng.ufl.edu

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