THE FLORIDA

ENGINEER

FALL 2009

VOLUME 96

FREE YOUR MIND

Can engineers cross the temporal divide to meld form with function?

UF UNIVERSITY of FLORIDA

THE GATOR ENGINEER GETS NAMED

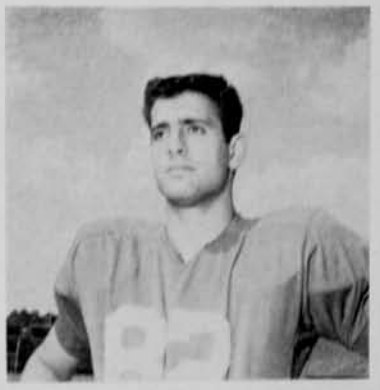
An excerpt from a 1959 article

"In football today, mental fumbles probably cost more games than any other single factor. For this reason today's football player must be able to think quickly and accurately. We in the College of Engineering are justly proud of our contribution to the Florida Gator Football team. At present there are 14 football players (varsity, red shirts, and B team) taking engineering courses. From the Freshman team there are an additional nine football players, bringing the total to 23 from engineering."

DICK BRANTLEY

PAT PATCHEN

U of F

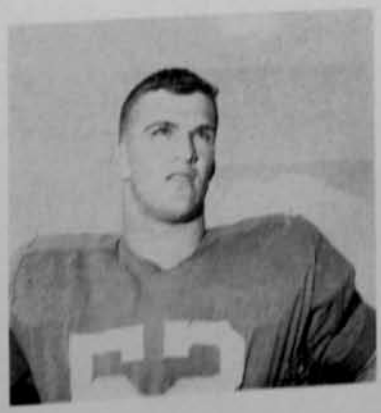


NICK ARFARAS

ROGER SEALS

DON SENTERFIT

BILL HOOD



SHANNON KALAHAR

THE FLORIDA ENgINEER

CONTENTS

FALL 2009

FEATURES

p.22

ENGINEERED ART This animatronic canary was one of six projects in this summer's Art and Engineering Design class team taught by faculty from the engineering and fine art colleges.

p.09

p.08

FUTURE GAME CHANGERS AND SUPER-CHARGED SPEED From Gator graduate students who will change the way our world looks and operates to a juiced-up Gator engineered computer that reigns as the fastest in the world.

DEPARTMENTS

COVER ILLUSTRATION: EDDIE GUY; THIS PAGE (CLOCKWISE FROM TOP): SHANNON KALAHAR; DAN PAGE: SHANNON KALAHAR

CONTRIBUTORS

ALEXANDER GELFAND is a writer in NYC, a former science teacher & ethnomusicologist who taught astronomy in Massachusetts, played jazz piano in Manhattan & drummed for animal sacrifice in Ghana, his work appears in *The New York Times*, *The Economist*, *Wired* and *Technology Review*. ALEXANDERGELFAND.COM

ALISSON CLARK is a UF alum whose work appears in *FLORIDA*, *FamilyFun*, *mental_floss* and *People*. After working as a feature writer and columnist, she spent five years as a stay-at-home mom before barging back onto the journalism scene as an editor of *Gainesville Magazine*. She's now a freelance writer. ALISSONCLARK.WEBS.COM

BOONSRI DICKINSON was born a gator and grew up on campus in Diamond Village. Later, she returned to UF to study chemical engineering. She is an assistant editor at Discover magazine in New York. Most recently, she went hunting for dinosaurs, Jurassic park style. BOONSRIDICKINSON.COM

JOHN CROWLEY when he's not immersed in technology working as a news producer with the Yahoo! Front Page team, he's reporting on tech trends in Silicon Valley. The 20-year veteran journalist considers Walter Cronkite his greatest professional influence, yet is partial to Stephen Colbert.

WAYNE GARCIA is a 25-year veteran of Florida journalism and politics, as a newspaper reporter, political consultant, educator and award-winning online journalist. He is spending the next year on the UF campus as a visiting lecturer in the College of Journalism and Communications.

SHANNON KALAHAR is a third year fine art student at UF and a business owner specializing in natural light portraiture. When she's not in the darkroom (yes, she still uses a darkroom) she can be found cooking or running rampant through Payne's Prairie. WAKINGHOURSPHOTOGRAPHY.COM

THE FLORIDA ENGINEER

PUBLISHER
Cammy R. Abernathy
Dean
caber@eng.ufl.edu

DIRECTOR OF COMMUNICATIONS
Megan E. Gales
mgales@eng.ufl.edu

EDITOR
Nicole Cisneros McKeen
nmckeen@eng.ufl.edu

ART DIRECTION
EmDash LLC
emdashonline.com

ASSISTANT DESIGNER
John Dunne
jdunne@eng.ufl.edu

ADVISORY BOARD
Mike Foley,
Joseph Hartman, Meg Hendryx,
Aaron Hoover, Mark Law, Angela Lindner,
David Norton, Liesl O'Dell,
Paul Pegher, Mark Poulalion, Erik Sander,
Wolfgang Sigmund, Ted Spiker

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.

ADVERTISING
Nicole Cisneros McKeen
352.392.0984
nmckeen@eng.ufl.edu

ENGINEERING COMMUNICATIONS & MARKETING
University of Florida
349 Weil Hall, P.O. Box 116550
Gainesville, Fl, 32611-6550
p. 352.392.0984 | f. 352.392.9673
thefloridaengineer@eng.ufl.edu

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

Preventable Maintaince

In your article "The Big Fix: Engineering's Role in Repairing America's Broken Healthcare System" by Donya Currie, it fails to mention a very big, and probably the most important part of the health care system, and that is public health and preventive medicine. Although your section titled "Prevention, the best prescription" it still does not focus on prevention. By the time patients reach the hospital, we are most likely talking about improving the most expensive part of health care. To decrease that expense and prevent people from going to the hospital in which a specialist is needed, more effort and money are needed in public health. Unfortunately, very few engineers go into public health. I just happen to be one of them.

MICHAEL WASHINGTON
B.S ISE '92, Deputy Director of the Preparedness Modeling Unit at the CDC

Coffee-Table Worthy

I wanted to let you know that the magazine has been fantastic recently. I actually take the time to sit down and read it from cover to cover now – even the covers and graphics seem so great! Excellent job!

ANDREA R. BROWN
P.E., BSCE (99), ME EES (08)

Nice Girls Finish Last?

While I was at first pleased to see an article in "The Florida Engineer" on the plateau of women engineers in the field of engineering, I was very disappointed that the four factors noted in the article as the cause of the plateau were not based on research. It is well documented that once in the field of engineering, women face a different and often more challenging environment than their male colleagues. Research into this area (National Academy of Sciences, National Science Foundation, National Research Council) has shown the technology playing field is still not level for women who choose careers in engineering and the hard sciences: "The reality is there are barriers that women face," said Kathleen S. Matthews, the dean of natural sciences at Rice, ... "There are circles and communities of engagement where women are by and large not included."

Worse yet, the third factor cited actually blames the women already in the field as a cause of the plateau. "Women who had bad experiences...." discourage their junior counterparts. Speaking openly about existing conditions (even if it discourages young engineers) should not be framed as a cause of the problem but as a healthy way to shine light on the problem and bring it into the open where it can be resolved.

As a woman with a successful 25-plus year career in engineering, I will not stop talking about my experiences as a woman in that field until those experiences stop limiting my ability to perform at my potential simply because I am a woman. If you are going to publish on the subject, please do not sugar coat the topic but base it on research. Only when the engineering community is willing to come to terms with the reality of the engineering environment is the number of women in engineering going to grow significantly.

LINDA SIGALLA HEDGES, PH.D,
.M.S.CHE '83

Plugged In

I am writing to commend you on your Summer 2009 issue of "The Florida Engineer". It's a joy to see you and your team put out such a quality publication. I was particularly impressed with the quality of the layout, pictures and other illustrations used in the articles. You succeeded in giving the issue a high-quality "Wired" type of feel. Keep up the good work!

JOS COCQUYT
B.S. MAE '04

WRITE US:
letters@eng.ufl.edu

We welcome your comments, suggestions and ideas. We reserve the right to publish any submission to the FE. While we will do our best to keep your submission intact, we may edit for length, style and clarity.

THE PHONE LINES ARE NOW OPEN

You may have noticed THE FLORIDA ENGINEER has a different look, a new energy, if you will. This look isn't only skin deep. We've also redefined the content. It's important to address issues significant not only to the Gator Engineering community, but to the entire engineering community. The comments have been good, but sparse. Don't be shy, this is YOUR magazine. Tell us what you think, what you love, what you loath, what you want... just tell us: letters@eng.ufl.edu **—THE FLORIDA ENGINEER STAFF**

BY THE NUMBERS *Cammy Abernathy*

Listing Dean Abernathy's accomplishments would take up the entire magazine. And frankly, listing each journal publication she contributed to would make the engineer's engineer wobbly-eyed. Instead, here's a taste of the curriculum vitae mapping the career path that helped put that new line at the top of her resume: Dean of the College of Engineering.

15 YEARS **10** MONTHS

A GATOR — (AS OF OCTOBER 2009)

DEGREES EARNED

3

72

PAGES OF CURRICULUM VITAE

8 AWARDS

Fellow of the AVS, 2002; AVS Distinguished Lecturer, 2001; Alumni Chair of Materials Science and Engineering, 2001; Fellow of the Electrochemical Society, 2000; University of Florida MSE Faculty Excellence Award, 2003, 1998, 1997; Stanford Engineering Graduate Fellowship, 1980

MORE THAN

6.5 MILLION

RESEARCH MONEY RECEIVED

SEVEN PATENTS

533 JOURNAL PUBLICATIONS

1 CO-AUTHORED BOOK

401 CONFERENCE PAPERS

7 EDITED BOOKS

8 BOOK CHAPTERS

38 INVITED PRESENTATIONS

3 PREVIOUS POSITIONS

Stanford University | RESEARCH ASSISTANT
AT&T Bell Laboratories | TECHNICAL STAFF
UF College of Engineering | PROFESSOR OF MATERIALS, SCIENCE AND ENGINEERING, ALUMNI CHAIR; ASSOC. DEAN FOR ACADEMIC AFFAIRS; DEAN

19 PH.D STUDENTS MENTORED

from 300 Weil Hall

Tucked away in Murray Hill, N.J., was a long multi-story building full of some of the world's most creative and dedicated scientists and researchers. It was Bell Labs, arguably the capitol of communications R&D in its heyday. Innovations as ubiquitous as the transistor, the laser, information theory, the UNIX, and the C programming language trace their roots back to Ma Bell. I was 27 when I was fortunate to land a job there as a member of technical staff. The ink on my Ph.D. diploma was still wet, and my hair was still brown.

It was at Bell Labs that I learned one of the most profound lessons of my professional life: No engineer is an island. There I was part of a larger team. People weren't labeled as materials engineers, electrical engineers or mechanical engineers. Instead, we focused on making a difference, on having impact. And without labels, there were no intellectual limits.

The most successful engineers immerse themselves in the lives of the people around them, finding ways to make life better for everyone. They spend their careers in the service of others, solving practical problems and meeting tangible needs. Their passion for people motivates them to do the unexpected and attain the impossible.

The best engineers — the ones truly destined to make a difference — reflexively reach beyond cultural, temporal and disciplinary boundaries. They understand that isolationism is a death sentence to creativity, but embracing differences cultivates innovation.

At the University of Florida College of Engineering, this is the kind of culture we wish to encourage, one which allows us to create new interdisciplinary programs attacking problems from a variety of perspectives. Because of our people and our broad array of research initiatives, our college has the opportunity to be a leader in this approach and capitalize on advances in areas like information technology, nanotechnology, and computational science to address the myriad of problems facing society. How will we ensure the availability of high quality, affordable health care? What will we do to address the nation's need for energy in an environmentally friendly manner? When and how will we rebuild the nation's infrastructure? We must shed our labels and remember instead that the true mission of an engineer is simply to help people.

The days ahead of us are rich with possibility. As I unpack boxes in an office that has been occupied by all but two of the College's deans, I am reminded of our heritage of innovation, and energized to think of the days ahead of us. Once again — with hair much grayer this time — I find myself immersed in a hub of creative thought. Our country depends more then ever on the R&D performed in our universities. Gator Engineering is ready to meet this need for the exciting years to come.

Sincerely,

Cammy Abernathy
Dean

Wanna talk to DEAN ABERNATHY? Send her an e-mail: thedean@eng.ufl.edu

ENgAGE

CUTTING-EDGE EDUCATION

Shortly before midnight on June 2, 1965, Houston had a problem. On that night — the night before the first space launch from the Kennedy Space Center in Florida but controlled completely from the Johnson Space Center in Texas — a faulty relay station brought down the communications line NASA rented for the occasion. Gator Engineering came to the rescue. BY MEGAN GALES

Thomas Martin came to UF from the University of Arizona in July 1963 to become dean after Joseph Weil retired. Florida's space and technology industry was booming, and to keep up, companies were eager to provide employees with graduate education. As a result, the state legislature called on UF to create a branch engineering school to serve East Central Florida.

Martin spent six months searching for a location, racking up 18,000 miles on his new beige Pontiac and flying 1,000 more miles. "Everyone from Daytona Beach to Melbourne wanted a branch school and needed one," Martin said in a 1964 "Gainesville Sun" article.

Martin's *aha*! moment came during dinner with an engineer friend. The solution was television. He devised the Graduate Engineering Education System, or GENESYS. More interactive than the competition, it used televisions and telephones to extend the classroom in real time to seven sites statewide. Classrooms had 23-inch TVs that could receive any channel. Audio could come from radios, telephones, microphones, phonographs or cable. Instead of raising a hand to ask a question, students pressed a button on a telephone, which triggered a light in the instructor's location.

Approved in January 1964, GENESYS officially opened in June 1965, days before NASA's middle-of-the-night appeal for help to program director John Hummer. NASA took what it needed from UF's early experiment in distance education, allowing Texas to make countdown for the launch in Florida. Gator Engineering helped fix the communication malfunction and the mission at stake, and Gemini IV made history with the first U.S. space walk.

GENESYS eventually led to the modern-day UF EDGE program, which delivers course content entirely online. Students from all over the world — even military pilots in Afghanistan — earn graduate degrees and certificates without visiting Gainesville. With a record 1,000 course enrollments, the program remains a popular continuing education tool for companies. □

AHEAD OF ITS TIME A Gainesville student flicks the telephone switch, activating a light in the transmitting studio, where John V. Wait, who is lecturing on electrical systems analysis, is alerted that the Gainesville classroom has a question.

IN THE NEWS 07.09

SUPER COMPUTER TAKES FLIGHT

A supercomputer named Novo-G, described by its lead designer as likely the most powerful computer of its kind in the world became operational at UF. BY AARON HOOVER

Novo-G gets part of its name from the Latin term for "make anew, change, alter," and the next part from "G" for "genesis." A reconfigurable computer, it can rearrange its internal circuitry to suit the task at hand. Applications range from space satellites to research supercomputers — anywhere size, energy and high speed are important, said Alan George, professor of electrical and computer engineering and director of UF's National Science Foundation Center for High-Performance Reconfigurable Computing.

Traditional computers use so-called "fixed logic devices" to perform a large variety of tasks. But this jack-of-all-trades approach requires a substantial amount of overhead in space and energy, no matter what work needs to be done. On the other hand, special-purpose computers can be built to perform certain tasks very well but are not flexible.

George says reconfigurable computers make the best of both worlds. That is because they can rearrange their internal circuitry like Lego blocks, creating the most appropriate architecture for each assignment. As a result, a reconfigurable computer can be from 10 to 100 times faster than other computers its size while using five to 10 times less energy.

> "It is very powerful technology, but it is also very complicated technology and we don't want it to only be accessible by experts."

Reconfigurable computers remain at the research stage and are not easy to use. One of the main goals of the NSF Center is to pioneer techniques to make reconfigurable computers more accessible."It is very powerful technology, but it is also very complicated technology," George said. "We don't want this important technology to be accessible only to experts."

UF has three partner universities in its reconfigurable computing center — Brigham Young University, George Washington University and Virginia Tech — as well as about 30 involved industry and government agencies. □

Can't get enough COLLEGE NEWS and updates? Check out the Headlines section: www.eng.ufl.edu

ILLUSTRATION BY DAN PAGE

SIX TO WATCH

These engineering graduate students have the moxie to make a difference in our lives, from creating stronger space materials to computer modeling gene networks to making sure third-world countries have clean water. **GATOR ENGINEERING** has never looked so cool. **BY ALISSON CLARK**

SHANNON KALAHAR

"I love coming up with new approaches to a problem. There's nothing that compares to the feeling of the 'aha' moment. That's what keeps compelling me to work on new problems."
—STEVE MYERS

ERIN TAYLOR, ECE
CLASS OF 2010

WHY WE'RE WATCHING: "We know the sequence of the human genome, but we have no clue what to do with it," says Taylor, a fifth-year doctoral candidate. Her bid to solve that problem lies in dynamic computer modeling of human gene networks.

"Gene networks are how we work – it's what makes us what we are. If we can understand them, we have the power to cure every disease known to man. This is the last missing piece of the puzzle – the future of genetic research."

Taylor teases out those interactions with simulations, focusing on a pathway scientists have nicknamed "Sonic Hedgehog" after the popular video game. That network governs neural development in utero, but also impacts brain health throughout our lives, so unlocking the secrets of Sonic Hedgehog could lead to cures for birth defects, Alzheimer's and brain injuries. The same pathway also has implications in skin cancer.

WHAT'S NEXT: Taylor hopes to post an open-source model of Sonic Hedgehog online within six months. Her larger goal, however, is to develop methods of uncovering network interactions that can be applied to any gene network in the body. She hopes the site will launch an online community where researchers post models for others to download and use. "I want to bring these computer models to the biological community in a way that's accessible to people with different backgrounds," she says.

WORD FROM THE LAB: Assistant professor William Ogle, Taylor's supervisor in the McKnight Brain Institute biomedical engineering lab says "Her computational modeling has already changed the way we think about a type of cellular signaling."

KEVIN HOMRICH-MICOCCI, CCE
CLASS OF 2009

WHY WE'RE WATCHING: As an undergrad at UF, the 23-year-old from Winter Park learned a statistic that haunted him: Worldwide, 25,000 people die each day from water-related diseases. He vowed to use his engineering degree to help developing countries, but it wasn't until this summer he realized he already had the skills to make a difference. "I started out at UF as a chemistry and math double major, but I realized what I was doing was theory, not problem-solving. It wasn't as applied as I wanted," Micocci says. "I was attracted to civil engineering because I could see it everywhere around me. It's hands-on."

While in Kenya on a church trip, Micocci worked with local water-management officials to design, plan and contract a well in the drought-stricken Naivasha region. He's now leading an effort at First United Methodist Church of Winter Park to raise the $16,000 needed to complete the work.

WHAT'S NEXT: After he graduates in December, Micocci hopes to go back to Kenya to oversee the implementation of the well. He'll return to Florida to work, but plans to continue giving his time and talent to help with third-world water issues.

WORD FROM THE FIELD: Associate professor Chick Glagola, who has known Micocci for two years, says it's not just Micocci's philanthropy that sets him apart.

"What I tell my students is that the variable that's most uncontrollable is people. He's very outgoing, very friendly, and also very results-driven. That combination gives him the innate qualities to be a success," Glagola says.

LIMING XIONG, MAE
CLASS OF 2010

WHY WE'RE WATCHING: This Ph.D. student from Central China caught the attention of the Georgia Institute of Technology and Sandia National Laboratories with simulation tools functioning on atomic, nano and microscopic scales. While existing multiscale technology cobbles together separate simulations, Xiong's concurrent simulation would pave the way for faster, more streamlined materials development. "So many phenomena cannot be explained by single-scale simulation. They are fundamentally multi-scaled," Xiong says.

WHAT'S NEXT: With a unified-scale simulation reliably predicting the performance of a material, researchers can develop targeted materials faster and cheaper. "When engineers study fracture and plasticity, the traditional approach is to establish fracture mechanics only at the microscopic level. With this technology, we can see atoms' motion and separation, develop new theories, create stronger alloys. For aerospace, we can design materials and know they will be able to sustain high temperature and pressure at the micro, nano and atomic level. This will solve fundamental problems for engineers, whether they're designing a car or a space shuttle," he says. Biomedical engineering also benefits. Biological matter is particularly hard to explain in single-scale. No man-made material is as strong as human bone and nobody knows why. If we understand the mechanisms of bones from simulation, we can make a material that mimics them, he said.

WORD FROM THE LAB: Assistant professor Youping Chen nominated him for MAE's 2009 Grad Student of the Year (he won), she pointed to his perfect scores on UF's qualifying exam, 12 journal papers, 10 conference presentations and five upcoming manuscripts.

SHANNON KALAHAR (ALL PHOTOS)

HYO SOO KIM, MAE
CLASS OF 2009

WHY WE'RE WATCHING: Kim spent three years as a manufacturing engineer at a Volvo construction-equipment factory in South Korea. When the company wanted to produce a new excavator, it was poised to spend billions on a new machine shop until Kim came up with a way to modify the existing machinery. "It wasn't my job directly, but I went down to the shop floor and saw the current machine could be modified to accommodate the new model – it was really simple," he said. Kim decided to go back to school. "They were very sad, but I told my manager, 'I need to study more.'"

Upon his arrival at UF, Kim set to work turning what his adviser, associate professor Tony Schmitz, calls a "back-of-the-envelope sketch" for a new type of displacement-measuring interferometer into reality. His new model, which he finished in less than a year, eliminates periodic error by using acousto-optical modulators instead of a polarizing beam splitter. Eliminating periodic error could be critical for applications from biomedical engineering to semiconductor fabrication. "Many applications will need more precise measurements. This model can do that," he says.

WHAT'S NEXT: In his final year in the Ph.D. program, Kim continues to hone his prototype, in order to bring the technology to market. He hopes to continue his research and mentoring (he supervises two master's students) as a professor.

WORD FROM THE LAB: Associate professor Tony Schmitz says Kim works with MAE's Korean Student Assoc. to help new graduate and undergraduate students find housing, choose courses and navigate the maze of paperwork international students face. He says Kim is "diligent, intelligent and humble."

DIPANKAR GHOSH, MAE
CLASS OF 2009

WHY WE'RE WATCHING: Ghosh, a Ph.D. student, is working to improve boron-carbide armor, used in tanks, aircraft and body armor. Ghosh looks at why the strong, lightweight ceramic armor offers less protection against projectiles moving at high velocity.

"The weakness at high velocity reduces the effectiveness of the armor, but no one knows why it happens. By using microscopic technology to capture the mechanism, I hope I can improve our understanding," he says. "Once you know why it happens, you can find out how to prevent it."

WHAT'S NEXT: In addition to his work with boron carbide, which has attracted the attention of the U.S. Army, Ghosh also works with ultra high-temperature ceramics that can handle the toughest aerospace applications, such as nose cones and leading edges. As the current space shuttle fleet moves toward retirement, Ghosh is optimistic that his work could help identify better materials for the next generation of spacecraft.

"The materials used in the space shuttle are not very strong, and they have poor oxidation protection. This research could help determine what can be used in future space shuttles," he says. "Whether it is armor or nose cones, a weakness or small crack can lead to catastrophic failure. The fundamentals are very important to understand."

WORD FROM THE LAB: Knox P. Millsaps Professor Ghatu Subhash, Ghosh's adviser, says "He is a quick learner who is not afraid to probe into complex physics and chemistry of materials. He is undoubtedly the best student I have advised in terms of research quality, dedication to the given task, work ethic and number of high-quality publications."

STEVE MYERS, BME
CLASS OF 2010

WHY WE'RE WATCHING: Millions of epileptics – up to 45 percent – who don't respond to drug treatment often resort to a vagus nerve stimulator, a pacemaker-like implant. It sends electrical impulses through the body at a set interval that doesn't adapt to the individual patient. Myers' research focuses on controllers that fire based on signals from the seizure sufferer's body.

"The gold standard would be a controller that can predict and detect when a seizure is coming an hour before and stop it," he says, adding that he hopes to have an improved controller licensed and on the market within five years.

WHAT'S NEXT: Myers plans to design medical devices, applying the first-hand knowledge from a yearlong clinical preceptorship at Shands. "When you spend time in a hospital, you see all of these great devices sitting in a corner covered in dust, because the person who made it didn't talk to the people who use it when they're working on its design. They might follow a doctor for a couple of days, but every doctor is different. That's where the engineering program's close relationship with Shands is a huge advantage. I get first-hand experience in the hospital; I have conversations with doctors in the hallways. That's going to help me make a device that not only works really well, but one that people will want to use."

WORD FROM THE LAB: Paul Carney, Wilder Professor and director of the pediatric epilepsy program at UF's McKnight Brain Institute, says Myers' excellent communication skills, entrepreneurial savvy and leadership will make him "an excellent neural engineering scientist."

"An engineer wants to get things done," he says. "It's so gratifying to work on research that can be applied now, not 20 or 30 years from now."

—ERIN TAYLOR

IT'S COMPLICATED

Recognition is nice. Funding is better. This year, these junior faculty have both. All were awarded a National Science Foundation CAREER Award or PECASE (Presidential Early Career Award for Scientists and Engineers) meant to nurture "the academic leaders of the 21st century." Their research ranges from leading-edge to bleeding-edge. But with up to $1 million in support, the smart money is already on them to succeed. BY ALEXANDER GELFAND

Productive Doodling

JING GUO *CAREER Award Winner*

Jing Guo wants to make computer chips faster and more powerful. And he wants to do it by making them more like pencils.

The assistant professor of electrical and computer engineering wants to build chips using graphene, a nanoscale carbon material similar to the tracings left behind by a standard No. 2 pencil — only millions of times thinner.

"It's truly two-dimensional, just one atom thick," says Guo of the substance, first isolated in 2004.

"Silicon has been the workhorse for a half-century," says Guo. Yet chip designers are now running up against its limitations. This is true both with respect to processing speed, and to the communications capabilities required by networked and mobile devices. Graphene, which conducts both electrons and heat extremely well, has emerged as a leading contender in the race to find a silicon substitute.

Because electrons move faster through graphene than they do through silicon, the ultrathin material has the potential to produce faster CPUs. It also emits and detects photons more efficiently, which should make it friendlier to fiber optic systems transmitting information in the form of light.

Graphene-only chips are a long way off. For now, Guo is building physical and predictive computer models based on quantum physics to design silicon-based chips incorporating graphene components. He shares these models through nanoHUB.org, a nanotechnology Web site. Researchers in Europe, Asia, and the U. S. already use them to run more than 10,000 graphene-related simulations per year.

Whoa, That's Heavy

MICHELE MANUEL

CAREER Award Winner

Hybrids and electrics are worse than gas-guzzlers at turning stored energy into power, according to Michele Manuel, director of the Materials Design and Prototyping Laboratory. They also weigh more, thanks to their heavy batteries and added electronics.

Manuel is working with GM to create new magnesium alloys to help alternative-fuel cars shed pounds and become more fuel efficient.

Magnesium has long been an attractive candidate for vehicle manufacturing; three times lighter than steel and 30 percent lighter than aluminum, "it's even lighter than some plastics," says Manuel. Unfortunately, the asymmetrical, anisotropic crystal structure of the metal means it can only be rolled into sheets at high temperatures, making it too expensive to compete with its heavier cousins.

Manuel is blending magnesium with nanoparticles of rare earth elements like yttrium and cerium to make alloys that can be worked at room temperature. The nanoparticles reduce the size of the metallic grains in the composites, and may allow the atoms in those grains to slip past each other more easily. But scientists don't yet understand exactly how such nanoparticle inclusions work, so Manuel aims to figure that out, too.

ISTOCKPHOTO (ALL PHOTOS)

Opposites Attract

JACOB JONES
PECASE Winner

The title of the project that earned Jacob Jones a $1 million PECASE grant — "Domain Wall Evolution in Phase Transforming Oxides" — is daunting enough. But you know you're really in trouble when Jones' best effort to explain his work in small, simple words leaves your head spinning. "Imagine," he begins, "that you were one nanometer tall..."

Jones, assistant professor of materials science and engineering, studies multiferroics, a class of "smart materials" in which electrical, magnetic and mechanical forces are all coupled. These composite ceramics are expert at converting one form of energy to another: Apply an electric field to them, and they might generate a magnetic one in return. Expose them to a magnetic field, and they might respond with a mechanical vibration instead.

This magic is made by a domain wall: a break or defect in the material's atomic structure. And it lies at the heart of all transducer-driven sensor technologies, from ultrasound imaging to accelerometers.

Jones seeks to better understand how domain walls affect the behavior of existing smart materials, and to develop new ones by pushing multiferroics into extreme states — exposing them to electric and magnetic fields simultaneously, for example, or working them at high temperatures — to see what new properties will result. With luck, those properties will lead to developing new sensors with novel capabilities.

Now Jones is able to boost useful working temperatures of his materials by "a couple of hundred degrees," a useful trick for extending the range of environments in which they could be used. But that just scratches the surface of what his superceramics might yield if properly tweaked. "... imagine imaging a magnetic field, which would be transformative, or sensors used in space applications, which are in extraordinarily extreme environments," he says.

STORE PHOTO: MICHAEL NEELON / ALAMY

Prepare for the Worst

YONGPEI GUAN *CAREER Award Winner*

Some people fear the unknown. Yongpei Guan just wants to manage it better.

Guan, an assistant professor in the Department of Industrial & Systems Engineering, develops stochastic and robust integer programming methods to help make rational decisions about an uncertain future. "We use mathematical programming techniques to solve probability problems," says Guan, whose research can be applied to fields ranging from retail sales (when should a retailer restock his shelves given unreliable demand?) to oil drilling (when should workers on an offshore platform be sent packing in the face of possible bad weather?).

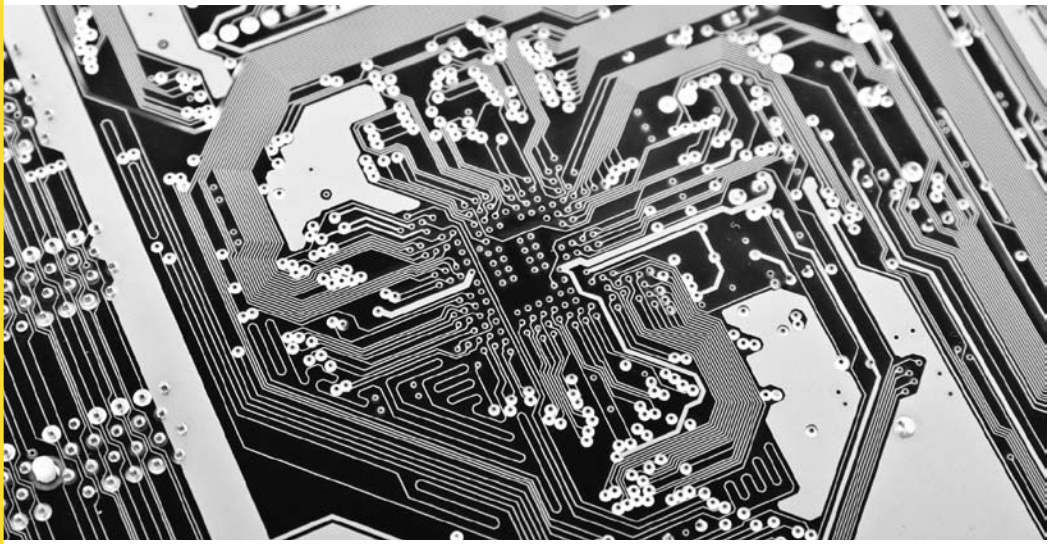
The "stochastic" part of Guan's work involves developing algorithms that can generate all of the possible outcomes for a given situation, attach probabilities to each scenario and determine the best response to each one. For many applications, like inventory control or stock pricing, this means minimizing costs and maximizing profit. A wise retailer will order just enough inventory to meet the most likely level of demand without running low or leaving goods on the shelves.

Sometimes, however, there's more at stake than just dollars and cents. Poor evacuation planning, for example, can lead to loss of life. That's where the "robust" bit comes in: using mathematical models to predict and avoid worst-case scenarios, like stranding workers on the open sea in a hurricane.

Guan's models involve tens of millions of variables and require loads of computing power. So he's also looking for ways to use computer resources more efficiently, both by improving the methods he employs to search for optimal decisions, and by breaking large problems down into smaller ones. The latter technique allows him to solve even the most complex problems through grid or parallel computing methods, harnessing large batches of networked processors rather than relying on a single supercomputer.

The New Rush Hour Traffic

TAO LI *CAREER Award Winner*



Tao Li calls it "the new Moore's law": whereas the number of transistors packed onto a computer chip was once expected to double every 18 months, now it's the number of CPUs likely to double over the same period. And while manufacturers like Intel and AMD have figured out how to build multi-core chips containing up to eight processors, they're going to need a whole new suite of tools to design so-called "many-core" chips containing hundreds, if not thousands, of them.

Li, who founded the Intelligent Design of Efficient Architecture Laboratory, compares managing the flow of data through a many-core chip to directing the flow of traffic through New York City: you need to monitor the whole system from above, while paying attention to street-level bottlenecks.

That's why he's developing computer models that employ geospatial analysis techniques to provide a global view of the behavior across an entire chip while simultaneously zooming in on individual subprocessors. Such models will allow chip architects to minimize the amount of time and power required to transfer data from one area of a chip to another, while reducing the amount of heat generated by cores stacked like crates on a delivery truck. (Heat degrades both the performance and reliability of a chip.)

In addition, Li is developing software tools to help manage the flow of data. These tools also use on-chip sensors to monitor performance and data traffic.

"We're five or 10 years ahead of what industry is doing today," Li says. But with Moore's new law taking effect, it won't be long before chip manufacturers find themselves in need of Li's prescriptions for relieving digital-traffic congestion.

Robots are a Real Good Shot

DAVID ARNOLD
PECASE Winner

Mechanized microchips. Steerable bullets. Robots so small you can barely see them.

This is the stuff of sci-fi fantasy. It's also the stuff David Arnold, an assistant professor of electrical and computer engineering, is cooking up in his lab.

Arnold, who specializes in microelectromechanical systems (MEMS) and microfabrication, previously developed coin-sized, 8-watt electrical power generators. Now, armed with $1 million in PECASE funding, nano-scale particles and the same electroplating methods used to fabricate everything from microchips to jewelry, he's building micromanets no more than a micrometer (Đm) wide (1 Đm is 1/100 the diameter of a human hair.) His goal: Use these itty-bitty attractors, which are fabricated much like conventional silicon chips, to power miniature valves, pumps and switches. Thanks to their minuscule mass and volume, these micromachines should handle extremely high frequencies and current densities. They will also operate at lower voltages and offer larger "stroke," or displacement, than electrostatic or piezoelectric actuators.

Macro-sized magnetic actuators are found in everything from audio speakers to electrical motors, and the range of applications for Arnold's micro-sized versions promises to be just as vast. The U.S. Army, for example, is interested in constructing "synthetic jets," tiny oscillating diaphragms that push fluid over the surface of a wing to reduce drag and increase lift. These would open the door not only to tiny surveillance planes, but also to "directed munitions": bullets and mortars that can be steered during flight. Magnetic microactuators could also be used to build miniature surgical robots and high-performance cell phone speakers.

"We just recently built and tested the first functional actuators using our micromagnet technology," says Arnold, who seems intent on proving the axiom that good things come in small packages. "The devices were 2 to 3 mm in diameter, and only .5 mm thick."

ISTOCKPHOTO (ALL PHOTOS)

STOCKSHOT / ALAMY

Yodel-ay-ee-oooo!

ANDREAS HASELBACHER
CAREER Award Winner

Growing up in Switzerland, Andreas Haselbacher saw plenty of snowslides. "Depending on the weather conditions, you would see multiple avalanches every day," he recalls. Now Haselbacher is trying to figure out what makes them tick.

Until recently, he explains, some avalanches were assumed to be nothing more than clouds of fine powder — albeit ones that travel at speeds approaching 300 km/h, leaving death and destruction in their wake. But that assumption didn't jibe with the masses of wet, dense snow they typically leave behind.

The latest hypothesis, therefore, posits the torrent of powder we see obscures a more slowly moving mass of dense snow below. Scientists also suspect there is an intermediate stratum of snowball-sized particles, called the "saltation layer," between the two.

If this were true, it would represent a classic example of a dilute-dense multiphase flow: a moving mixture of fluids and particles in which the latter occur at various concentrations. Proving this empirically is next to impossible: the powder cloud hides everything beneath it, and avalanches tend to destroy everything in their path — including research equipment.

Enter Haselbacher. The assistant professor of mechanical and aerospace engineering plans to put his background in computational fluid dynamics to work developing computer simulations that will accurately model a phenomenon so dangerous and unpredictable that it is very difficult to study in the wild.

By improving our understanding of how avalanches work, the models should also help predict them more accurately. They may also shed light on related natural phenomena, like the pyroclastic flows that accompany some volcanic eruptions. □

Learn more about these amazing, young, inspiring researchers:
thefloridaengineer.eng.ufl.edu

IN THE NEWS 07.09

FEELING IS BELIEVING

That's the premise of this video game-like project geared toward teaching kids the basic concepts of nanotechnology through touch. The project recently received almost $200,000 in funding from the National Science Foundation. BY KIM FULSCHER

THE COOL KIDS DO IT
As advanced as a nano-technology themed video game seems, pint-sized product testers grasped the idea within moments.

After interest in engineering started declining, UF began participating in programs to instill a fascination in science for kids. Curtis Taylor's project even leaps a few steps forward. The video game-like software can be used to teach visually impaired students about nanotechnology.

"What's unique about our project is we're looking at a student population that's traditionally marginalized," said Taylor, an assistant professor in mechanical and aerospace engineering. "I knew that there exists very few methods for teaching visually impaired students."

When Taylor spoke to homeschooled third- to eighth-graders several years ago, he became interested in this idea. Trying to get across a concept they couldn't even see, he started making analogies of how small an atom is — smaller than bacteria, an ant, or a grain of salt.

"When it comes to nanotechnology, I'm blind, students are blind," Taylor said. "So why can't we use this to teach visually impaired students as well?"

Breaking it down, nanotechnology is the engineering and manipulation of tiny molecular materials. Engineers know exactly what that is, but it's a hard concept for kids to grasp. So Taylor is creating the ability to touch and interact with a nanoscale virtual environment — it's a much more effective way to learn nanotechnology than by traditional graphics and lectures. He's working hard to make sure kids want to grow up to be engineers.

"There are no TV shows about engineers," Taylor said with a laugh.

He may have already got one hooked, though.

Jackson McKeen, 7, got to try his hand at the software in Taylor's lab. According to the second-grader at Gainesville's Saint Patrick Interparish School, this device could help him learn about science in a way he would never in his school's science class.

"This is much better," Jackson said. "You get to see what these things feel like."

It's even a little better than his video games at home.

"On my games, on my PlayStation 2, you just play games and you don't get to feel," he said. "There's options — you can turn vibrations on — but I don't think that counts."

Nanotechnology is so important because smaller materials can create superior, reliable, stronger products. For instance, Taylor said, the cell phone in the 80s was "the size of a suitcase and could only make a call." Now, partially thanks to nanotechnology, the cell phone possibilities are endless.

To help explain these tiny materials, Taylor's project lets students like Jackson feel nanoscience with their hands — a feat that few elementary science classes can conquer. A familiar object, such as a coin or compact disc, is zoomed in to the microscale then to the nanoscale with the surface of the object magnified on a computer screen. Think of this software like a microscope, only with the added kinesthetic aspect.

Using a joystick, the user — ideally children between 5 and 17 years old — controls exploration over the magnified object. The joystick mimics the high power atomic force microscope that Taylor uses in his lab to obtain images of material surfaces. This instrument has the ability to observe features as small as atoms. The joystick is like the needle on a record player, and lets the user feel the grooves, bumps, and tiny features on the object at the nanoscale. In addition, the user is allowed to feel the unique nanoscale forces and interaction. The user doesn't have to see at all to feel that an object actually has many more properties than appear on the surface.

Now, Jackson doesn't just know what a lecture about atoms sounds like. He can tell you what an atom looks and feels like.

"You've seen a Coke fizz, right?" Jackson said. "Well the atom was green and looked like that. There were small green bubbles on the atom and they have a blue outline. It's sort of thick."

Taylor and his small team of researchers ultimately want to use the funding to help get this learning device in classrooms across the country within a few years. Before that can happen though, the software/joystick combination needs more testing. □

See professor CURTIS TAYLOR talk about nano-technology research: thefloridaengineer.eng.ufl.edu

COURTESY OF CURTIS TAYLOR

ILLUSTRATION BY JOHN DUNNE

THE SAVVY ENGINEER

Success Secrets from Superstar Engineers BY BOONSRI DICKINSON

Six engineers reveal their secret to success: They are motivated, goal oriented, can recognize opportunity and love what they do.

While there is no magic bullet for success, there are certain ways to achieve it. Erik Sander, B.S. ME '84, has taught many UF grads how to turn their bright ideas into technologies that can transform lives. Sander measures success by "how someone changes the world and how they are remembered after they pass on." Engineering sharpens analytical skills people need to solve problems in our complex world. The most successful engineers are hard workers, love finding a solution, and have an insatiable drive to make the world a better place.

Create Your Own Reality

Entrepreneur John Dasburg received all three of his degrees from UF (B.S. ISE '66, MBA '70, JD '73) — and is the chairman and CEO of ASTAR Air Cargo. Dasburg worked hard for success. "Being poor motivated me to be successful. I lived in the same room with my sister and father until I was 10," says Dasburg. "Engineering teaches a very disciplined way of thinking and it requires a correct answer."

Have A Goal in Mind

Jack Dorsey, a computer engineer who dropped out of New York University a semester before graduation, created Twitter. When Dorsey visited New York City as a teenager, he was fascinated with the dispatch technology used by taxis and emergency vehicles and wanted to apply that to instant messaging. Success did not come overnight. It took several years to get millions hooked on tweeting. "The secret to any success is fairly simple: start now and execute quickly. Have a picture in your head of what you want to see in the world. Start small, and build piece by piece, involving others as you go. Every detail matters, so be patient and strong," Dorsey says.

Get Out Of Your Comfort Zone

As CEO of Discover Financial Services, David Nelms, B.S. MAE '83, says being strong with numbers in engineering is helpful in financial services. After graduating, Nelms says he paid a lot of attention to detail by focusing on results and execution early on in his career. "The rotations at GE and Bain & Company gave me exposure to multiple industries," he says. Nelms, who gave up the sunshine in Florida to move to Chicago, says it's important to be willing to relocate. Throughout his career, he moved to Boston, Delaware, Kentucky, and Virginia. "I took lateral opportunities by shifting companies and learned more along the way," Nelms says. He always tried to do a better job than the person before him and would volunteer to work on extra projects so he could get more time with management.

Pursue Your Dreams

Bob Uhler, M.E. EES '74, is CEO of MWH Global. "I can't image life without a passion to accomplish something and make a positive difference in the lives of others. The formula to my success has been to have a dream, stay with it and surround myself with opposites," he says. "The dream can be refreshed, but everyone needs an end goal and to be able to articulate that goal to yourself. Life is full of setbacks, failures and adversity and you should not let them destroy the potential of your dream. Overcoming adversity makes us stronger and wiser if you want to learn. In the end, if you don't make your dream, don't let it destroy you because it is the journey and pursuing your internal passion that counts the most."

Recognize A Problem and Fix It

Michael Dancu, CEO of Arteragen, received his Ph.D. in bioengineering from Penn State University. The key to success is to be passionate about what you do, he says, and to keep on learning. Recognizing problems in health care and the inability of new technologies to penetrate the field, Dancu set out to create solutions to improve the healthcare system. "By nature, I am a designer who utilizes the tools of science, mathematics, engineering to create new ideas and concepts. All I can say is that I am a nerd and like to solve problems with an open perspective." He now owns several biotech companies and has more than a hundred patents. □


PARKER

ILLUSTRATION BY CURTIS PARKER

IF YOU BUILD IT, IDEAS WILL COME

Gator Country to Disney World. Tampa Bay to the Space Coast. In the middle of Florida's sunny coastal borders lies the **HIGH TECH CORRIDOR** where three universities threw away territorial imperatives and decided collaboration, innovation and a dash of tenacity was exactly what Florida needed. **BY BOONSRI DICKINSON**

THE FLORIDA HIGH TECH CORRIDOR COUNCIL IS LIKE MATCH.COM FOR CENTRAL FLORIDA TECHNOLOGY COMPANIES AND UNIVERSITY RESEARCHERS

The Corridor's Matching Grants Research Program is dedicated to supporting university researchers so they can further develop their commercially viable products and ideas into something company partners can take to market. "The funds drive technology toward commercialization for economic development," says Erik Sander, the University of Florida College of Engineering's director of industry programs. And that drive, that commerical motivation, is exactly the intent.

The FHTCC is an economic development initiative proven to attract, retain, and grow high-tech industry and the workforce to support its 23 counties, according to the council's 2008 benchmark study.

The Corridor began in 1996, as an alliance between the University of South Florida and the University of Central Florida. UF joined the corridor in 2005 and now FHTCC reaches cities like Gainesville, Tampa, and Orlando, and along the coasts including Sarasota, Melbourne and Daytona. But the real power lies in the technology companies and university researchers that connect because of the corridor.

And for the University of Florida, progress is good. UF has received about $5 million of funding from the State of Florida of which about 80 percent has gone to Gator Engineering projects. Since 2005, the Corridor approved 50 grants to UF researchers, matched by grants from their industry partners. We want to create this high-tech hot spot and want smart people to flock here, Sander says.

"I don't know if we want to be Silicon Valley, but we are definitely carving out our own identity. Gainesville is a biotech hub, Orlando is known for simulation and training, and Tampa is known for IT and space technology," said Sander.

Twenty-three Central Florida counties, 13 years since its inception, three major research universities, more than 300 company partnerships, more than 250 participating university faculty, more than 2,000 graduate students, 90 patents, a return of more than $600 million to the State of Florida — **WELCOME TO THE FLORIDA HIGH TECH CORRIDOR COUNCIL**.

RIVERVIEW

MOSAIC

WHO: Charlotte Brittain, research & development manager in phosphates at Mosaic Fertilizer and David Hahn, UF mechanical and aerospace engineer

WHAT: A crop nutrition company working with UF faculty members to improve their phosphate mining and processing. Various new sensors will assist with monitoring the process and other advanced technologies to enhance clay settling characteristics.

WHY: About 75 percent of U.S. mined phosphate comes from Florida. Crops and animals need phosphorous to survive, and there's no synthetic substitute for it. Farmers need it for their crops to grow. It's a relatively old industry, but UF researchers helped with new, innovative, methods for mining and processing phosphorous. After passing heat exchangers and a sulfur tank, equipment moves the phosphorous rock into the operation. Then the warehouse holds the gigantic mound of diammonium phosphate until it's ready to be shipped.

WHY WE NOTICED: Mosaic must remove huge amounts of dirt from the ground and separate the phosphate from sand. Hahn's laser-based sensors can provide real-time sensing and replace the manual process the company relies on. Other UF researchers can help quicken the clay settling process. For phosphorous removal, the mined ore is pumped for up to 10 miles through slurry pipes, which clog if overloaded. The company hopes to place sensors along the pipes to avoid this. When the company finishes mining phosphate, they restore the land to an equal or better condition. "The land is brought back to use, such as parks, native scrub-land or wetlands," she says.

UF IMPACT: The FHTCC provided Mosaic Fertilizer with the brains of six faculty members and 10 students, and invested a total of $400,000 into the project.

GAINESVILLE

SHARKLET TECHNOLOGIES

WHO: CEO Joe Bagan of Sharklet Technologies; Tony Brennan, UF materials science and engineering professor and Founder and CTO of Sharklet Technologies

WHAT: The company engineers surfaces so MRSA, E. coli, and Staph cannot grow in places like hospital rooms. Brennan designed the pattern after the skin of a shark to prevent bacteria from growing on its surface.

WHY: "We anticipate the Sharklet surface in a hospital will reduce the amount and strength of cleaners required. It reduces the transference rate of bacteria between surfaces via either humans or other contact mechanisms," says Brennan. In the lab, when Brennan immersed the shark-like surface in algae water, the surface had 85 percent less algae growing.

WHY WE NOTICED: Green algae and bacteria tend to communicate and can join forces. When the biofilms start growing on surfaces or within the body, they slowly build an army until they attack — and sometimes, this can be fatal. Yet hospitals provide an ideal breeding ground for bacteria: There, the bacte-

ria can either multiply inside the body after growing on urinary catheters or it can grow on surfaces like nursing call buttons, bed rail control panels, and cardiac monitor screens.
UF IMPACT: Sharklet Technologies received two grants that supported six faculty members and six students. "The High Tech Corridor money enabled us to expand our bacterial studies significantly to include multiple strains," says Brennan. The researchers expect to obtain patents for their IP work.

GAINESVILLE

SINMAT

WHO: Rajiv Singh, co-founder and vice president and materials science and engineering professor at UF, and his wife, Deepika Singh, founder and president of Sinmat
WHAT: A materials nanotech company that will make everything we do more energy efficient.
WHY: Singh makes cheaper semiconductors and he knows how to manipulate the copper wiring so the chips have minimal defects. As a result, his substrates decrease the cost of manufacturing chips in half. His technology saves energy in other ways: It can make LED lights that are 60 percent more energy efficient, improve solar cells, and plug into smart grids. "There are a billion transistors on a chip. It's a miracle if it works. Everything is ruined if one thing goes wrong," Singh says. Today, the typical substrates are the size of a hand around 12 inches, but Singh is making them into the size of an 18-inch pizza.
WHY WE NOTICED: President Obama recognized Sinmat in his "Clean Energy" speech on March 23 because of the company's energy saving solutions.
UF IMPACT: Sinmat has received several grants totaling $8 million dollars. It has supported three faculty members and 10 students over the years.

MELBOURNE

AUDIGENCE

WHO: CEO Lee Krause; UF partners include Alice Holmes, communicative disorders, and Rahul Shrivastav, communication sciences and disorders
WHAT: Clarujust™ software helps personalize cochlear implants, digital hearing aids, and cell phones, so the hearing impaired can tune their device to speech sounds. The typical hearing aid amplifies sound.
WHY: 28 million people currently require a hearing device. Krause become deaf in his 20s, and insisted on having a cochlear implant attached to his skull, so his brain could sense sounds as actual signals. The digital hearing devices can tune to the individual when he hears speech sounds, rather than tune using tones. The person doesn't need much — just needs access to the Internet and a computer.
WHY WE NOTICED: Clinical tests are being done at UF. It is awaiting FDA approval.
UF IMPACT: Audigence received about $200,000, and funded two faculty and two students.

GAINESVILLE

AXOGEN

WHO: CEO Jamie Grooms
WHAT: Bringing the science of nerve repair to life through the development of tissue-based technologies that structurally support nerve re-growth.
WHY: First company to distribute a human tissue-based nerve graft that bridges transected peripheral nerves helping to support the body's own natural healing process. Nerve damage can happen after a traumatic injury or due to surgery. These injuries can impact a person's ability to feel or control their muscles.
WHY WE NOTICED: "We've restored the tibia nerve allowing a 15-year-old girl to walk again and done breast reconstruction to allow for sensory regeneration," says Grooms. Nearly 1,500 patients benefited from the company's tissue-based technology that promises to help restore and repair nerve function in the nerves outside the brain and spinal cord. "This product directly impacts people's lives so significantly, from children and soldiers to people that need to be able to smile or walk again," says Grooms. By using micro-surgical procedures to implant the nerve graft, nerves are able to naturally re-grow and potentially restore nerve function.
UF IMPACT: "We've done a significant amount of our clinical work as well as pre-clinical work at the University of Florida," says Grooms. They also tend to recruit interns and have hired some as full-time employees.

"I DON'T KNOW IF WE WANT TO BE SILICON VALLEY, BUT WE ARE DEFINITELY CARVING OUT OUR OWN IDENTITY." –ERIK SANDER

GAINESVILLE

XHALE

WHO: CEO Richard Allen; UF principle investigators include Dr. Donn Dennis, anesthesiologist, Dr. Richard Melker, anesthesiologist, Dr. Tim Morey, anesthesiologist, Dr. Matthew Booth, chemist
WHAT: Start-up company that applies breath and novel vapor analysis in pharmaceuticals, health monitoring and diagnostics
WHY: To improve healthcare with breath detectable SMART drugs, breath-based diagnostics and to reduce hospital acquired infections.
WHY WE NOTICED: Xhale has several projects in the pipeline. HyGreen™ is a real-time hand hygiene system that reminds healthcare workers to wash their hands, records hand hygiene compliance data, and can help track disease vectors in the healthcare setting. The SMART Medication Adherence System works with patients and physicians to ensure compliance to medications. Xhale's diagnostics division is working on a breath-based glucose monitor measures glucose in the breath. Other projects include a Propofol monitor, ethanol detector, and therapeutic drug monitoring.
UF IMPACT: Xhale received two grants providing them with $400,000 from FHTCC. This helped support six faculty members and one student. In all, breath-based technologies provide a safer medical environment with non-invasive testing to replace finger sticks and blood draws. ◻

This was just a sampling of Corridor brilliance. See all the companies involved in the FLORIDA HIGH TECH CORRIDOR: thefloridaengineer.eng.ufl.edu

photographs by
SHANNON L. KALAHAR

FRAMIN
INGE

NG
NUITY

While the marriage of **ART AND ENGINEERING** may seem strange, it is, in fact, considered educational vogue in the national debate on redefining engineering education. And in an old warehouse in Gainesville, Fla., more than two dozen freshmen engineering students and four art students took part in an experimental collaboration poised to electrify both disciplines at UF.

by **WAYNE GARCIA**

The warehouse is nondescript, tucked away behind a strip of retail stores on University Avenue in a neighborhood that has seen better days. It is sparce, at the end of a one-block street, with only the smallest of signs to announce it as "WARPhaus."

It is the University of Florida's School of Art and Art History's studio and gallery space. On an afternoon in August, art and engineering students are starting to filter into the space, gathering around five different tables framed by walls covered with Post-It notes and schematics that chart the course of their design processes.

At one table, five or six students gather around a cubic-foot clear-plastic box set atop a plain, black surface. A bright yellow animatronic canary is the only thing on the stark surface. A computer ribbon runs from the base of the clear canary cage to a laptop computer as one student tries to calibrate the bird, which is tweeting loudly and intermittently.

"Do you think this is messed up?" one freshman engineering student asks another in the design team dubbed Enginerds.

"It seemed to just read it," the colleague replies of the sculpture's on-again, off-again volatile organic compounds (VOC) detector.

After six weeks of classes and working as teams three or four nights a week plus weekends, the design teams taking EGN 1935 Art and Engineering Design, during the summer semester, have scant minutes before two professors — engineering Dean Cammy Abernathy (a materials science engineer) and Jack Stenner, an assistant professor of digital media art in the School of Art and Art History at UF — who will judge their creations.

SAD, BUT CRAFTY: Since canaries are so sensitive to methane and carbon monoxide, miners used to bring a caged canary into new mines. As long as the canary kept singing, the miners knew their air supply was safe. A dead canary in a coal mine signaled immediate evacuation.

Team Captain Planet, Team Clean, the Enginerds, D2: Dynamic Design, Team Awesome and Gators 4 Change all scramble together to finish projects that are part art display, part engineering feat. Their task: work in a collaborative structure to design a marketable product that will detect airborne VOCs and give an alert to the user. More importantly, they had to integrate the ideas of art students with the ideas of computer, mechanical, electrical and civil engineering students.

This is the story of how they worked together, what they designed and produced, and a growing discipline of cross-pollinating arts and engineering to produce a new level of creativity and understanding of design.

"Intellectually, people often tend to separate form and content," Stenner says. "For both disciplines [art and engineering], this class illustrates how form and content work together to provide better design outcomes. An approach such as this can produce better artists AND better engineers."

That was what Abernathy hoped for when she reached out to the art school to partner on the pilot-project course.

"There's a growing trend in engineering that to be really creative, you have to engage both sides of the brain," Abernathy says. More and more, aesthetics is driving engineering design. Just look at the iPod, she adds, "the example of what happens when good engineering meets good design."

A second advantage for students is that the course puts freshman engineers thick in the middle of the design process, with its exhilarations and challenges, instead of wading through book-thick math and physics courses for two years before getting into design-process work. Abernathy wants to find a way to mainstream the art-meets-engineering idea and offer this course to every incoming freshman engineer.

And third, the concept of inculcating art concepts and vocabulary in engineers gives them new tools to better communicate how engineering relates to the public, a key precept "Changing the Conversation," the National Academy of Engineering's clarion call for engineers to better engage the public at large in the importance of what they do.

Bill Wulf gets it. As president emeritus of the National Academy of Engineers and one of only 13 faculty members at the University of Virginia to carry the title "university professor," Wulf says engineering education is in the early stages of transition away from a 1950s math-and-science model to a more holistic, customer-driven model. "The reason we are in transition is that more and more people believe we lost something when we made that 1950s transition; it's the teamwork," said Wulf, a computer sciences engineer. "[We need to] really deeply understand what the customers' requirements are. That's not a mathematical thing; that's a human thing."

Wulf points to the kinds of technical innovations that have changed the world online: the World Wide Web and Google, to name two. "[In] all the really important developments, the underlying impetus was a creative one, not a mathematical one, and an intensely human one."

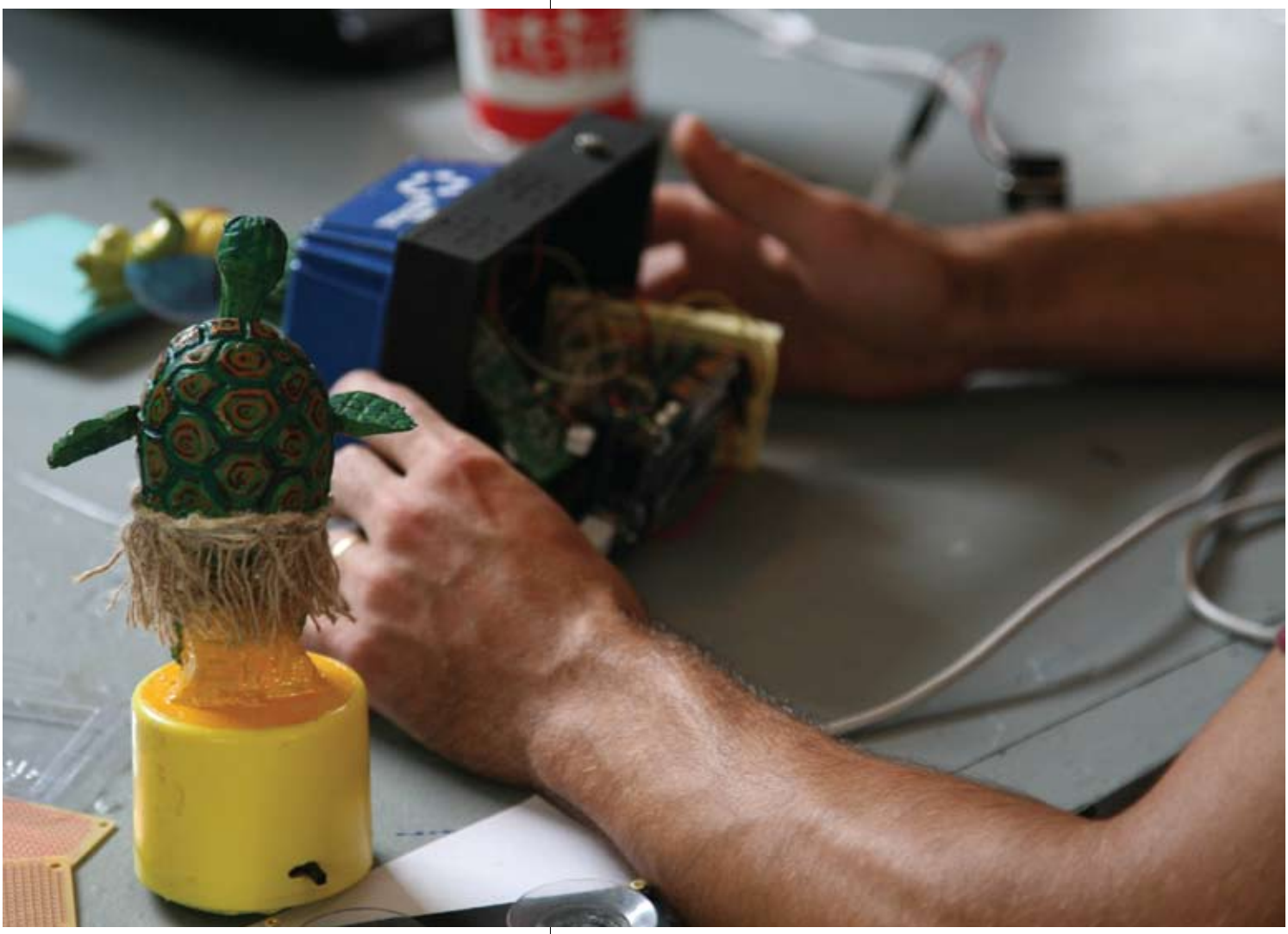
Exploring the relationship between art and engineering is an emerging trend at just a handful of U.S. universities, but its importance to industrial design cannot be denied. Take this observation from the reclusive Jonathan Ive, the senior designer for Apple credited with the look and function of such groundbreaking designs as the iPod and the current brushed stainless-steel Macintosh laptops who spoke of his landmark products in a rare 2003 interview: "The defining qualities are about use: ease and simplicity. Caring beyond the functional imperative, we also acknowledge that products have a significance way beyond traditional views of function."

Ive also supports another objective of the UF pilot course: getting freshman engineering students quickly into team design settings.

"Teamwork is the only way —not out of principle, but out of necessity," Ive told Ten4 magazine in 2006. "You can't develop these ideas and take them to market by yourself."

Exploring the relationship between form and function, or design and engineering, is crucial in today's marketplace, says William Lidwell, the author of "Deconstructing Product Design", set to be published later this year by Rockport Publishers.

"The popular answer is that art focuses on form, engineering on function, and product design sits at the intersection. This view is more wrong than right," Lidwell said in an e-mail interview from his office in Houston, where he works as a consultant and author on design and technology issues. "Artists



SUCCESS (IN THEORY) The experimental fusion of design and engineering students was successful, at least measured by the enthusiasm shown by the students. Dean Abernathy says this class will be offered again.

"Intellectually, people often tend to separate form and content," Stenner says. "For both disciplines [ART AND ENGINEERING], this class illustrates how form and content work together to provide better design outcomes."

aspire to satisfy requirements that are internally derived. If nobody else likes or understands the outcome, it doesn't matter because the work need only satisfy the artist to be successful. Designers and engineers need to satisfy requirements that are externally derived. If design or engineering requirements are not satisfied, a product will objectively fail. How do art, design, and engineering relate? Art serves the artist. Design serves the need. Engineering serves the function."

He added: "Engineers need to learn more about how products are perceived, why products get accepted and rejected, and how products are actually used in the wild. The program that successfully connects engineers to users in this way is the program that will define the future of engineering education."

UF's pilot art-meets-engineering class follows several prominent engineering schools' pioneering efforts in this area. Northwestern University, for instance, has for years enjoyed a partnership with the Art Institute of Chicago to produce lectures and research into art conservation science. And the best known arts-engineering curriculum exists at Princeton University, where civil and environmental engineering professor David Billington teaches two wildly popular courses (Structures and the Urban Environment, originated in 1974, and Structures and Machines in Urban Society, started in 1985) that have their roots in the "Swiss synthesis," an educational model that merges science and art education "with complex mathematical analysis and unwavering attention to form," as the university describes it. Billington uses K'NEX toys to create elegantly designed bridges in one course.

TESTING 1,2,3
Marc Plaisant tests a volatile organic compound sensor. VOCs are made with high vapor pressure and low water solubility. Many VOCs are human-made chemicals used and produced in the manufacture of paints, pharmaceuticals, and

> "This has been MECHANICAL, ELECTRICAL ENGINEERING. This has been ART, SCULPTURE, COMPUTER ENGINEERING, [and] PROGRAMMING. You name it, this class has everything rolled into one."

Across the room from the Canary in a Coal Mine project, Team Captain Planet is working furiously on and around its project, a "Hula Green" prototype of a grass-skirt-wearing turtle perched atop an upside-down blue recycling bin.

"This has been mechanical, electrical engineering. This has been art, sculpture, computer engineering, [and] programming. You name it, this class has everything rolled into one," says a hot-glue-gun weilding Jake Kubisz, a candidate for the master of fine arts degree and the art student in Team Captain Planet.

The Hula Green detector looks horribly far from being ready; as Kubisz glues, another student fine tunes the VOC detector. Three or four pieces remain disconnected from each other, and all seem like they will barely fit inside the small recycling-bin base.

But what the Hula Green detector lacks in completeness it more than makes up for in artistic symbolism and kitsch. Kubisz explains:

The sea turtle is "a symbolic icon on drainage ditches" to remind people of not dumping, to preserve the environment; the turtle also "makes an allusion to soapbox preachers by standing on top of the recycling box he has something to say;" and "the more in-depth audience" might recognize the circle of the turtle's hula motion as reminiscent of the circular nature of recycling.

"A little bit of humor, a little bit of irony," he concludes. "The sculpture is an environmental satire, I would say, with a productive moral. It's educational."

And, unassembled, it works. Another team member places a Sharpie pen near the VOC detector, and the slight fumes from the black marker set off the electronics. The turtle sways; the recycling emblem lights up; and (incongruously) the unit plays the theme from the 1960s hit television series Hawaii Five-O.

Over at Team Awesome, Michelle Gibson, a first-year engineering student, stands next to Kishi, the Japanese name (it means "happiness to the earth") the team has given to its VOC detector, a three-foot-long orange-and-blue wooden gator sculpture.

Incorporating aesthetic concerns into their project "helped us make it a little more interesting," Gibson says. Team Awesome's gator is covered with rhinestones, but its VOC detector is tucked inside the opened jaws. The team envisions placing the gator at The Hub bus stop to alert students to exposure to high VOC levels. Green LED lights in the eyes and mouth turn to red when the brightly painted sculpture is exposed to VOCs.

And therein, as they say, lies the problem. The team painted the gator orange and blue, and the drying paint is still giving off VOCs as it dries. And the background VOCs in

the art studio aren't helping either. Kishi's eyes are glowing bright red even without a test sample of a VOC source (either a Sharpie pen, methyl ethyl ketone or PVC cement) being set near it, which is how the course's professors will be testing all the projects.

So Team Awesome waits for its laptop to arrive to tweak its VOC detector. Only minutes remain until judging starts.

All the teams were taught the basics of the IDEO collaborative process, a user-centered system developed by engineering pioneer David Kelly. They developed their concepts, brainstormed and presented a design plan to the class. Based on feedback, they continued to alter their designs and prepared to fabricate prototypes to be entered into the end-of-class competition.

For the freshmen, not used to collaborative work or fabricating from scratch, it was akin to learning how to swim by being thrown into the pool. But each team overcame those early struggles.

"There was a point in the semester where it went from panic to 'we can do this,'" Abernathy says as she waits to judge the projects during the last class meeting. "You've got to have the ability to function as a team."

And the benefits went both ways, as the art students were thrown into an unfamiliar situation, as well.

"You learn about the value structures that emanate from a particular discourse; in this case, engineers," Stenner says before the judging. "They normally don't work this way when they are making art. You don't normally do collaborative types of artwork. It's not typical for most of these students."

The competition judging begins. The Gators 4 Change team gathers around a clear Plexiglass box that resembles modernist art, with a spherical spiral of thick metal suspended from the top of the cube and surrounded by a web of very fine wire dotted with tiny LED red, yellow and green lights.

"Originally, we named it Wally because it was supposed to be on the wall," explained Adriana Espinal, a first-year mechanical engineering student. "But now we changed its name to WATCH—Wireless Application Transforming Community's Health. With our piece, we pretty much still wanted to remain with the same concept, that VOCs are everywhere. That's sort of what the LED lights signify. The sphere is the world. We're trying to say that VOCs are everywhere, in every community and by being able to sense them, we're improving our health."

Even the box has meaning as well as function, the Gators 4 Change team explains: The clear box says that when waste goes into the atmosphere, it is trapped and doesn't dissipate. We have to live in it.

"All the bad that we're doing to the world, it's not going to go away by itself," Espinal says.

Fellow engineering student Alexis Weill then details how the WATCH sculpture comes with a small, metal sensing box that actually contains the VOC detector and relays a signal wirelessly to the sculpture box.

"We decided we would have a sensor that you can move around," Weill says. The sensor likewise has LEDs. You can have the direct input with the three LEDs or you can put the [sensor] box anywhere you want in your apartment or your house or your back yard and have this piece of art in your living room."

Team Clean is up next. Its project is called "The Iron Lung," and it consists of a 3-foot-tall rotating fan that has been retrofitted with a VOC detector that triggers two alerts: a color panel that changes colors when VOCs are present, and a four-stage audible cue. The fan sounds like it is breathing when there are no VOCs present, and the breathing becomes increasingly labored into outright coughing as VOC levels increase. It is whimsical and (after a bit of tweaking and delay) functional as the class leans

THE RESULTS ARE IN...

A week after the judging, Stenner gives the following assessment: "I think they all did remarkably well considering the time constraints, particularly given the amount of time required for other classes they were taking. All of the projects were creative and technically challenging for people who had limited experience actually making things, much less utilizing electronics."

D2'S BIKE DETECTOR
"Eco-Trip, worked REALLY well."

TEAM CLEAN'S IRON LUNG
"I love FANtastic's idea of the 'breathing' fan."

TEAM CAPTAIN PLANET
"Hula-Green was delicious in a kitsch kind of way."

THE ENGINERDS
"The Miner's Canary was a really nice blend of metaphor with an aesthetic twist that made it more suggestive and meaningful. "

TEAM AWESOME
"Of course, Kishi the Gator was something every UF sports fan would want/need."

GATORS 4 CHANGE
"I liked the social capability of the WATCH piece and the way it would unify recognition of environmental exposure around a central display/artwork. "

forward to hear the low, steady breathing that emanates.

Once perfume is sprayed into the fan's front panel, however, the prototype begins to cough.

The other teams give their presentations, with varying degrees of success. Gators 4 Change get Kishi the gator working after two false starts. Team Captain Planet's Hula Green had its wiring broken as team members tried to stuff too much circuit board and other electronics into a too-small base underneath the dancing turtle. No hula and Hawaii Five-O this afternoon.

D2: Dynamic Design is up next with its Eco-Trip, a bicycle outfitted with a VOC detector housed in a sleek, silver module. It is a complex project, with lots of wires running from the detector to an alert and down to a motor powered by the bicycle wheel. The team wins kudos for its modularity, how it split up into a design team and electrical team, which was split into the sensor and the LED teams.

After a successful test of the VOC detector, first-year civil engineering student and D2 member Christopher Bailey tells the tale of the project's difficult birth.

"You know how you all talk about the good side first of the project?" he starts. "I feel we have to talk about the negative side first to show you our pain. Saturday, we're here creating this project, we're gluing this together, we end up with a circuit board and everything is great, and it breaks right when we attach it. So, it's Sunday night, the project is due today, right? We have no tools, this [studio] is locked." But with a knife to cut breadboard and some creative rewiring without solder, "somehow we got it work," Bailey explains.

Engineering graduate assistant Marc Plaisant intones: "Guys, welcome to college."

And even as applause for the project rings out, instructors ask for one more test: "Ride it." Another team member hops aboard and takes it for a VOC-detecting spin around the small gallery space, and nothing falls off.

When it is time for the canary, all the other team members gather attentively. The loud bird's electronic chirps have been heard on and off throughout the afternoon, and everyone wants to see it work. But despite three different VOC sources put in front of the canary box's fan, the bird won't chirp. The problem is a transistor that, as it heats, changes the sensitivity setting of the VOC detector. After a quick adjustment, the bird's box is re-assembled and PVC cement is held to the box's fan.

The canary sings like, well, a canary. It bobs and twirls and chirps loudly.

The competing teams applaud. A few people laugh.

The competition is over. There is no single winner. Just engineers talking in more aesthetic and holistic terms, and artists thinking about how to apply their newly learned development process.

"To be able to pull this off, you did a great job," Abernathy tells them. "I'm really impressed with the teamwork, the design philosophy that you were able to incorporate. This just shows that when two very different disciplines get together, some interesting and fun things, useful things, can happen." □

Watch the behind-the-scenes action unfold of engineering meeting art: thefloridaengineer.eng.ufl.edu

"W.A.T.C.H." OUT
aka "wireless application helping transforming communities health." The lights change colors depending on the various levels of toxins in the air. A unique facet of this design, is the sensor located in an external box, (also fit with the green, yellow and red lights) that fires the LEDs from a distance.
(PICTURED: ALEXIS WEILL, MEKUTABASI ARCHIBONG, GENIVIER PETERSON, ADRIANA ESPINAL, AND ASYA HUDSON).

10

BENTON HALL, 1911

Before Orange met Blue, there was engineering. The University of Florida's predecessor institutions offered degrees, but the program needed strong leadership and clearly defined objectives. When the Buckman Act consolidated Florida's higher education institutions and created modern-day UF, engineering education became a Gator tradition. **BY MEGAN E. GALES**

YEARS

and counting...

"Dr. Benton was one of the finest professors that ever taught at the university up there."

— Leon B. "Skeet" Thrasher (B.S. CE 1913), who became a leading expert on Florida's roads. In 1925, Thrasher built U.S. 441 across Payne's Prairie — and silenced critics who claimed the road would succumb to its marshy surroundings. When he died in 1991, Thrasher was a week shy of his 100th birthday, the last charter member of the Florida Engineering Society, and the oldest UF alumnus.

1910
SCIENCE HALL AND EXPERIMENT STATION BUILDING OPEN

These buildings, now named Keene-Flint Hall and Newell Hall, respectively, gave Gator Engineering a home until the College found a more permanent location the following year.

1910
DEAN JOHN R. BENTON

B.S., Trinity College, 1897 / B.A., Trinity College, 1898 / Ph.D., University of Gottingen, Germany, 1900

It began with a man named Benton. Recruited to the Sunshine State by UF's first president, Andrew Sledd, the College's founding dean was one of the University's original faculty members.

1911
ENGINEERING BUILDING OPENS

This building was later renamed Benton Hall in honor of the College's founding dean.

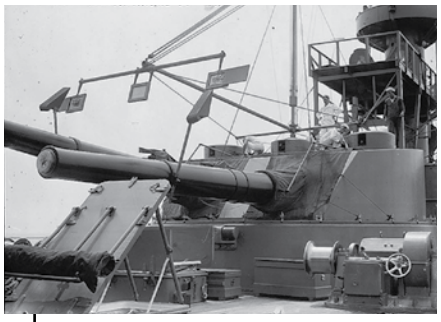
1914
BENTON ENGINEERING SOCIETY FORMED

1910
COLLEGE OF ENGINEERING CREATED

"Gentlemen, it will look a little pretentious for our University to be organized into separate administrative groups known as colleges, but I am looking to the future... You will have to start with small enrollments, but all great things have small beginnings. Gentlemen, you will see the day when more colleges will be added. It is imperative that we lay a foundation for big things in the future."

— UF President Albert A. Murphree, addressing the faculty in 1909. Four colleges, engineering among them, were officially formed before the 1910-1911 school year.

1916
FLORIDA ENGINEERING SOCIETY FILLED



1918
WORLD WAR I

University activities put on hold

1926
MECHANICAL ENGINEERING BUILDING OPENS

Now called Walker Hall, the College's second building was located adjacent to the first, Benton Hall.

1923
UPSILON CHAPTER OF SIGMA TAU HONORARY ENGINEERING FRATERNITY ESTABLISHED

WESTERN UNION TELEGRAM

1921
BENTON MEETS WEIL

John Benton often used his summers for continuing education. In 1921, he went to Pittsburgh for a course at Westinghouse, where he met a 24-year-old recently married electrical engineer named Joseph Weil.

"I thought, 'what could be nicer than to get a job with an educational institution where you worked a few hours a day — I thought — and have the rest of the day and night to do what comes naturally!'"

— Joseph Weil on why he pursued a career in academia. At 2 o'clock in the afternoon on the day after Labor Day in 1921, Weil and his new bride, Anna, arrived in Gainesville on a wood-burning train. Benton met them at the station in his car and took them to the Commercial Hotel. For their first meal in Hogtown, Weil walked to a nearby tobacco store and bought what turned out to be a dry orange (and at 15¢, it was expensive) and a box of moldy crackers.

1928
GRADUATE PROGRAMS ESTABLISHED

1929
ENGINEERING EXPERIMENT STATION ESTABLISHED

1930
DEATH OF JOHN BENTON

The F.F.F. — Florida's Faithful Five — exists no more. Death has made a breach in the line of the Old Guard, and the surviving four stand smitten— too much hurt to tell what they are suffering. The sudden and unexpected demise of him who was to them successively Doctor, Dean, Benton, John — even if they did not call him by his first name — is all the more a shock, for he is the first of the little group of men, thirteen in all, who formed the original faculty of the University of Florida, to die while still connected with the institution; and of the five remaining until now on the campus, he was the youngest.

— Dr. C. L. Crow in an article titled "Death Calls Dean Benton: Beloved Member of "Florida's Faithful Five" Yields to Pneumonia at Home on January 8," published in The Florida Alumnus, January 1930

"The local people got interested in trying to sell Gainesville to the rest of the world, and so went to the legislature, and prevailed upon the legislature ... to make a powerful radio station so that they could sell Gainesville to New York and Atlanta and Boston and what have you."

— Joseph Weil, on the founding of the area's first radio station. The state legislature in 1925 appropriated $50,000 for the station, but it wasn't enough. Two years later, it added an additional $100,000 and put the station under the supervision of the College of Engineering. Dean John Benton chose Weil, then the head of electrical engineering, to oversee it. Headed to a family vacation in Pittsburgh, Weil and his wife, Anna, took the later-legendary radio announcer Red Barber, who had just graduated from UF, with them so he could interview for a job at WLW in Cincinnati.

WRUF SIGNS ON THE AIR

1932
DEAN BLAKE R. VAN LEER

B.S. EE, Purdue University, 1915 / M.S. ME, University of California,1920 / M.E., Purdue University, 1922 / Sc.D., Washington and Jefferson University, 1943 / D. Eng., Purdue University, 1944

"Yes, we were supposed to teach students. We also had a faculty and it was part of our obligation to build our faculty. And it was also an obligation that the professional knowledge that we had should be available not only to the University of Florida, but to the state as a whole. And it was not unusual for us to get calls... that they had a problem, could we help them with the problem. We would in every case do so."

— Joseph Weil on his philosophy of the College of Engineering's role

Joseph Weil

1937

DEAN JOSEPH WEIL

B.S. EE, Johns Hopkins University, 1918 / M.S., University of Pittsburgh, 1926 / D.Sc., Jacksonville University, 1960

Joseph Weil had a budget of $67,000 and a payroll of 24 people when he became dean.

1937

LET THERE BE LIGHT >

"The Athletic Department is anxious to secure an estimate on the cost of lighting the stadium for night football. There is a possibility that we may be able to do this in the near future, and of course the cost is the most important factor. Consequently we are asking that, if possible, you and your staff prepare an estimate of the cost of this installation."

— Percy Beard, assistant athletic director, in a letter to Joseph Weil, Sept. 28, 1937

1934

DEPARTMENT OF INDUSTRIAL & SYSTEMS ENGINEERING ESTABLISHED

1934

COLLEGE HOST FIRST ENGINEERS' FAIR

Brought more than 3,000 people to campus between 7 p.m. and 11 p.m. Exhibits included a wireless lightbulb, a perpetual motion machine, copes, microscopes, airplane engines and more

1941

EIES FUNDED

The state's funding of the Engineering and Industrial Experiment Station helped grow the College's research program. "By conducting research at our own University on problems of direct interest to the industries of the State, we imbue our graduates with the needs and requirements of Florida."

— Ralph A. Morgen, EIES director, in a 1950 report

1943

WORLD WAR II

"While we can't say we developed the proximity fuze, we certainly added to the development of that fuze very materially."

— Joseph Weil on the College's war-era research efforts. The proximity fuze allowed missiles to be activated when they neared their targets.

"It was an interesting time... Because many of the students were older and interested only in getting their education, I think I had more acceptance. UF prepared me very well. I was not spoon fed and the faculty always encouraged the students to reach beyond where we could touch easily."

— Maryly Van Leer Peck (M.S. CHE '55, Ph.D. CHE '63) in The Florida Engineer, January 1985. Peck, who was the daughter of the College's second dean, went on to a successful career in both industry and academia.

1955
FIRST WOMAN TO EARN A GATOR ENGINEERING GRADUATE DEGREE

1953
ENGINEERS FAIR TRADITION REVIVED

The annual event had been on hiatus since the days of WWII, but in honor of the University's 150th anniversary, once again became an every-year thing.

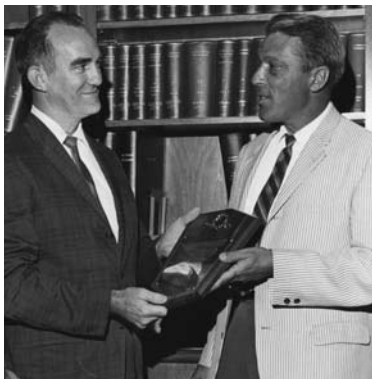
1950
ENGINEERING AND INDUSTRIES BUILDING

When Florida's Fighting Gators played their first football game of the 1950 season, the spectators received an additional treat. At the south end of Florida Field stood the new Engineering and Industries Building, illuminated by flood lights. It was an impressive sight; significantly so, for this building is symbolic of the strides which the state of Florida has taken in engineering and industry.

— The Florida Engineer, January 1951, in an article titled "A Modern Home... The Engineering And Industries Building"

1957
NUCLEAR ENGINEERING DEPARTMENT ESTABLISHED

1959
METALLURGICAL ENGINEERING DEPARTMENT FORMED



1963
DEAN THOMAS L. MARTIN JR.

B. EE, Rensselaer Polytechnic Institute, 1942 / M. EE, RPI, 1948 / Ph.D., Stanford University, 1951

1964
GENESYS PROGRAM APPROVED

January 21, 1964, was a red letter day for engineering education in the state of Florida. On that date, the State Cabinet Board of Education gave final approval to the Graduate Engineering Education System (GENESYS) program of the College of Engineering. This approval gave final clearance to launching the program and a target date of January, 1965, was set for the operation of all units of GENESYS. Preliminary operation, in temporary facilities at some of the locations, may be feasible by July, 1964.

— Florida Engineering News, a publication of the Engineering and Industrial Experiment Station, February 1964

1966
BENTON HALL DEMOLISHED

Built in 1912 to house the College of Engineering and Department of Physics, Benton Hall was recently condemned after 53 years of service to the University of Florida. The building was recently evacuated because the north and south walls were found to be leaning outward. This condition is attributed to the weight of the heavy tile roof with a 45 degree pitch and the fact that there were no horizontal ties to resist the outward thrust.

— Engineering Facts From Gatorland, Vol. 2, No. 2

1970

ENGINEERING COMPLEX DEDICATED

"These buildings, representing economical construction and flexibility of design, are a major asset to the State of Florida. The nine buildings cost over $8.5 million...As we move into the decade of the seventies, and toward our goal of excellence in engineering education, it is now up to the faculty and the students to prove that the investment by the Legislature, the University Administration and the various Federal agencies was justified."

— Dean Robert Uhrig, in the program for Engineering Complex Dedication. The dedication included the naming of four noteworthy buildings: the new Benton Hall, after the College's founding dean, John R. Benton, whose original namesake building had been torn down four years prior; Black Hall in honor of influential and accomplished chemistry and environmental engineering Research Professor Emeritus Alvin Percy Black; Larsen Hall in memory of former electrical engineering department Chair Merwin J. Larsen, who led the department through a 14-year period of tremendous post-war growth until his death in 1965; and Weil Hall, in honor of Dean Emeritus Joseph Weil, who spent his entire 45-year academic career in the College.

1969

INVENTION OF BIOGLASS

Larry Hench, professor of Materials Science & Engineering, created Bioglass, the first manmade material to bond to living bone.

1969

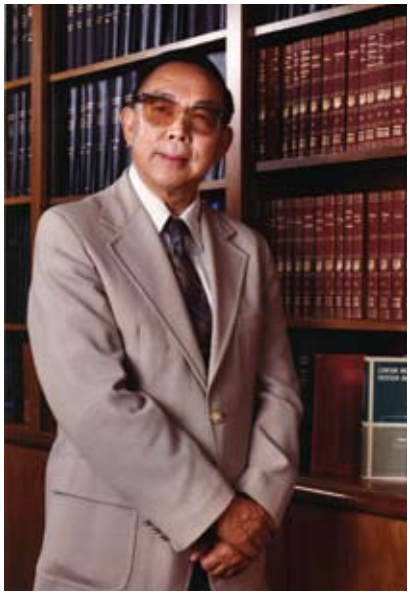
DEAN ROBERT E. UHRIG

B.S. ME, University of Illinois, 1948 / M.S., Iowa State University, 1950 / Ph.D., Iowa State, 1954

1973

DEAN WAYNE H. CHEN

B.S. EE, National Chiao Tung University, 1944 / M.S. EE, University of Washington, 1949 / Ph.D. EE, Math, University of Washington, 1952



"So I wrote him a letter, and told him 'I would love to work under you on my Ph.D., but I can't come if I don't have financial assistance because I am too poor.' Within a month he wrote me back saying he was happy to receive me as a student and that he would take care of the rest. Before I knew it, I was here [in Gainesville, Fla.]. That letter was the turning point in my life."

— Pramod Khargonekar, who would later become the College's eighth dean

1978

PRAMOD KHARGONEKAR ARRIVES IN GAINESVILLE

Living in Bombay, India, Pramod Khargonekar was about to start graduate school and wanted to study with the best: Rudolf Kalman, a world authority in systems theory and professor in UF's Department of Electrical Engineering.

1997

NEW ENGINEERING BUILDING OPENS

The $19-million New Engineering Building was dedicated in February 1997 after two years of construction. With 135,000 gross square feet, the building houses classroom, office and laboratory space for the departments of Environmental Engineering Sciences, Aerospace Engineering, Mechanics and Engineering Sciences, and Electrical and Computer Engineering.

1988

DEAN WINFRED M. PHILLIPS

B.S. ME, Virginia Polytechnic Institute, 1963 / M. AE, University of Virginia, 1966 / D.Sc. AE, University of Virginia, 1968

1986

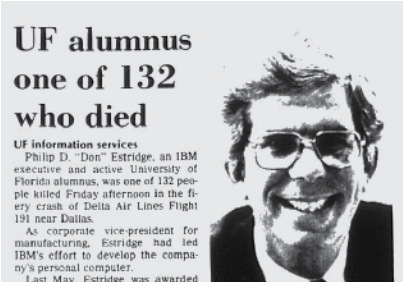
COMPUTER SCIENCES AND ENGINEERING BUILDING OPENS

1985

DELTA PLANE CRASH

Philip D. "Don" Estridge, an IBM executive and active University of Florida alumnus, was one of 132 people killed Friday afternoon in the fiery crash of Delta Air Lines Flight 191 near Dallas. As corporate vice-president for manufacturing, Estridge had led IBM's effort to develop the company's personal computer.

— The Gainesville Sun, Aug. 6, 1985, reporting on the tragedy that killed both Estridge and his wife, Mary Ann.



UF alumnus one of 132 who died

UF information services

Philip D. "Don" Estridge, an IBM executive and active University of Florida alumnus, was one of 132 people killed Friday afternoon in the fiery crash of Delta Air Lines Flight 191 near Dallas.

As corporate vice-president for manufacturing, Estridge had led IBM's effort to develop the company's personal computer.

Last May, Estridge was awarded

2001

DEAN PRAMOD P. KHARGONEKAR

B. Tech. EE, Indian Institute of Technology - Bombay, 1977 / M.S. Mathematics, University of Florida, 1980 / Ph.D. EE, University of Florida, 1981

Pramod Khargonekar was the first Gator Engineer to return to his alma mater and become dean.

2002

DEPARTMENT OF BIOMEDICAL ENGINEERING CREATED

2004

FIRST FEMALE ASSOCIATE DEAN APPOINTED

2005

DISTANCE LEARNING OVERHAULED

What began as the GENESYS Program, then became FEEDS, then OEEP, was transformed into an all digital, Internet-based program. Today, Dr. Pamela Dickrell (Ph.D. ME '05) leads UF EDGE, which enables students to earn complete master's degrees entirely online.

2006

GENEROUS GIFT

UF President Bernie Machen announced today that St. Petersburg inventor, surgeon and entrepreneur J. Crayton Pruitt Sr. has committed$10 million to UF for its Department of Biomedical Engineering. As a result of the gift, University officials will name the department in honor of the Pruitt family, making it the first-ever named department at UF.

— From a press release issued by the University of Florida Foundation and the College of Engineering on Jan. 17, 2006

2009

OPENING OF THE BIOMEDICAL SCIENCES BUILDING

AND BEYOND...

"There is a clear national consensus that biomedical engineering is a very important emerging field... While we have had a graduate program in Biomedical Engineering, there is a growing sense that it is time to form a Department of Biomedical Engineering."

— Pramod Khargonekar in a memo to faculty dated Sept. 18, 2001, on the importance of biomedical engineering. It had been part of the College for a surprisingly long time

2009

DEAN CAMMY R. ABERNATHY

B.S. MSE, MIT, 1980 / M.S. MSE, Stanford University, 1982 / Ph.D. MSE, Stanford University, 1985

2008

NANOSCALE RESEARCH FACILITY OPENED

ALL IMAGES COURTESY OF CARL VAN NESS AT THE UNIVERSITY OF FLORIDA ARCHIVES

TOBY BURDITT

1988

MICHAEL HSING

Relaxed and tranquil thrives in competitive Silicon Valley

BY JOHN CROWLEY

Michael Hsing has spent a lifetime with his gaze fixed firmly on the horizon.

Whether it was moving from Shanghai, China to study engineering at the University of Florida (B.S. E.E.), building one of the world's leading analog semiconductor companies, or competing in high-performance aircraft, his focus on what's ahead remains precise and unwavering.

Despite the demands of his ultra-competitive, high-stakes global field, Hsing, 50, is not a man of unbridled intensity. He's devoted to his wife and son and refuses to subscribe to the typical 24-7 Silicon Valley schedule.

The president, chief executive officer and director of Monolithic Power Systems Inc. is as relaxed and tranquil as the shady, tree-lined office park that's home to the company known as MPS.

"We work hard and strive to do our best," Hsing said of his 650-person team, "but at the same time, we must enjoy it."

That theme is evident throughout Hsing's entire operation — where meetings rarely last more than an hour, laughter punctuates employee conversations and the air hums with a blend of creativity and efficiency.

"When I started the company I had no actual business plan. No document. We only had a simple idea behind it," said Hsing, who held senior technical positions at companies such as

Supertex, Inc. and Micrel, Inc before launching MPS in 1997.

"That actually had many benefits. We improvised and engaged and we reacted very quickly to business conditions and opportunities in the marketplace. And the current organization is operated in this way. We're very nimble, extremely efficient. We can change direction in days."

MPS' advanced analog and mixed-signal semiconductors are used extensively in computing and network communications devices, LCD monitors and TVs, and a wide variety of consumer and portable electronics.

The San Jose-based firm has grown at a staggering rate — annual revenue increased by an average of 46 percent between 2003 and 2008. Last year MPS reported annual revenue of $161 million. You'll find it on the NASDAQ under the symbol MPWR.

"We see a billion dollar business ahead of us" Hsing said.

Incredibly, Hsing has found time to fit another passionate pursuit into his life.

Several years ago he began taking flying lesson to combat a fear of heights. He received his pilot's license in March 2007 and six months later began training in aerobatics, which involves rotation of the aircraft on its longitudinal (roll) axis or lateral (pitch) axis.

Aerobatics, although graceful in its movements, pushes both the pilot and the machine to their individual limits. In some countries, the pilot must wear a parachute when performing. Hsing recently placed 8th at a Western states event.

His plane is a German-made, carbon-fiber machine that slices through the sky with a 300-horsepower engine. The MPS logo is emblazoned in blue on both sides, framed by the aircraft's distinctive silver-and-red color scheme.

It pulls a lot more Gs than the Red Baron," he said with a smile, proudly pointing to a framed picture in his office.

And while they are two distinct and separate aspects of his life, the parallels between engineering and aerobatics are undeniable.

"They're both about solving problems," Hsing said. "They're both about dealing with an unusual environment. How do you react when continuously challenged? The answer to that is what defines fulfillment and success." □

For more stories about alumni go to development.eng.ufl.edu

ALUMNI BY YEAR

1984

Andre DuPont, B.S. CHE
recently published the book "An American Solution for Reducing Carbon Emissions: Averting Global Warming Creating Green Energy and Sustainable Employment" carbondioxidecontrol.com

1987

John (Jay) Brown, B.S. CISE
was promoted to senior development manager, CNN Broadcast Production Systems, in 2008. He's a member of the technical staff at CNN that was recognized in 2008 by the National Academy of Television Arts and Sciences for its development and implementation of an integrated and portable IP-based live edit, store-and-forward digital news-gathering system. In September 2007, CNN was recognized for development of the same IP-based contribution system with the IBC Innovation Award.

1988

C. Andre Rayman, B.S. Survey and Mappintg, P.S.M, GISP
Rayman was named president of Engenuity Group, Inc. Rayman who has been with Engenuity Group, Inc. since 1988, was made director of the firm's survey department in 2003. In June of 2004, he became one of the first geographic information systems professionals in the country to receive the designation geographic information systems professional by the GIS Certification Institute. Rayman was named a partner in the firm in May of 2005. He developed and managed the GIS Systems for the Town of Lake Clarke Shores, the Town of Ocean Ridge, the Town of Gulf Stream and Northern Palm Beach County Improvement District. He has also played an active role in the local community by serving on the Countywide GIS Technical Committee and by being a member of the Florida Surveying and Mapping Society. 1992

1992

Michael Washington, B.S. ISE
became the deputy director of the Preparedness Modeling Unit at the CDC. The goal of the expertise both internally and internationally is to support the development of models and modeling programs emergency response cycle (i.e., mitigation, preparation, response, recovery), with the aim of improving community resilience to and recovery from health crises. They plan to work with models in all areas of the CDC, including but not limited to transmissible disease epidemics (H1N1 pandemic influenza virus), food-borne disease outbreaks, toxic exposures, hurricanes and other calamitous weather-related events, CBRNE terrorism events, etc... Eventually, they will move into

1978

J. Paige Straley, B.S. EES

Straley had dreams that had nothing to do with physics, recycling or air quality.

Three decades ago ,on a night before fall finals, clutching an illustration of a hare in one hand, Straley sat at his desk and wrote about a bunny named Jack who just wanted to get home in time for Christmas.

In November 2006, that poem was turned into "Jack's Christmas," an illustrated children's book. About 2,100 copies have sold, and it recently went into a second printing. A sequel is also in the making.

Straley said his environmental engineering work didn't influence "Jack's Christmas" much, but his wife disagrees.

"There's a love for the environment (in the book) and keeping it clean — so people like Jack can have a place to live," Dianne Straley joked.

At UF, environmental engineering courses ruled his academic schedule — but words and poetry dotted his extracurricular schedule. During Straley's time at UF, visiting musical artists such as pianist George Winston and a Russian violinist captivated him, along with lectures on topics such as animal and human cognition.

"Everything was happening, man," Straley said. "It was a hell of an intellectual time for me."

While an environmental engineer, Straley worked for different engineering companies — most recently, Clariant Corp. in North Carolina. He was the environmental and safety manager and worked in permit writing, recycling and contracts. He won an award for a project in sulfur black-sodium phiosulfate clean up.

After Clariant, Straley was did consulting work and is now retired. It was after retirement when Straley let writing take over. It is one part of his life he says won't change — his fascination with poetry and writing.

Check out *Jack's Christmas* online. www.jackschristmas.com

modeling STIs, chronic diseases, and other public health systems. "Medical Decision Making" was published this summer on the capacity and cost of a mass influenza/pneumococcal vaccination clinic, which is very timely considering the potential of mass influenza vaccination campaigns this influenza season. He will also travel to Uganda to train U.S. and African graduate students about economic epidemiological modeling.

2002

Jason Kirk, M.E. EES
serves as a Lieutenant Colonel in the Charleston South Carolina District of the U.S. Army Corps of Engineers where he assumed command in July.

2004

Deanna Hasenauer Pafundi, B.S. NRE, M.S. NRE '06, Ph.D. NRE '09
is a clinical medical physics fellow at Mayo Clinic in Rochester, Minn. Her work has been published in many journals. She continues her research in radiation treatment accuracy.

2006

Amanda York Ely, Ph.D. BME
is a scientist at RTI Biologics in Alachua, Fla.

1973

Jim Allchin, B.S. CISE

As an engineering powerhouse with Microsoft, Jim Allchin helped develop Windows NT, Windows XP, Windows Vista and Windows Server. He was a master at building operating systems and server networks, but now he's just trying to build chord progressions.

Since his retirement in 2007, Allchin re-ignited his passion for music, which was a second or third priority during the days of his close work with Bill Gates and Steve Ballmer. A seasoned musician since his undergraduate days at the UF, he wanted to use his free time to write and record an album for his sons. The album is titled "Enigma," after primitive de-coding machines. It was released this year and received significant recognition from *Real Blues Magazine*. "I always wanted to record an album for my sons," he said. "If anything ever happened I wanted leave them with that piece of music." This isn't the first time in Allchin's life he's given up work for music. As an undergraduate studying in the seminal days of UF's computer science program he left multiple times to tour the Southeast as a musician. Broke and dejected from life on the road, he returned to education with a strengthened sense of opportunity, he said. Allchin said the determination eventually got him to Microsoft. When he's not spending time with his children, he's playing the guitar, writing or recording up to six or seven hours a day working on a second blues album. "I thought I would work with computers until [i was] 90, so music is kind of a dream world to curl up in," he said.

To read more about Jim Allchin and hear his music go to the-floridaengineer.ufl.edu

COURTESY OF JIM ALLCHIN

2007

Nathan Currier, B.S. CCE
M.E. CCE '08
is a bridge designer with Finely Engineering Group, Inc. As a structural engineering graduate research assistant, he researched the cracking behavior in prestressed segmental bridges under thermal and mechanical loading, utilized analysis and testing methods in structural applications and conducted data analysis and reporting. Currier has been active in both professional and community organizations including the American Society of Civil Engineers, ASCE Southeast Conference — steel bridge team, and a Hurricane Katrina relief project.

Judah Richardson, M.S. MAE
joined Cessna Aircraft Co. in Wichita, Kansas and works on their business jets as a stress engineer. Ricardson says he is headed to Wolfram Alpha in Champaign, Illinois as a research engineer.

2008

Lauren Sher, B.S. CCE
is a civil engineer with the utility engineering group at Calvin, Giordano & Associates in Fort Lauderdale. She's currently part of a team working on the next generation of water supply — treating wastewater to extremely high standards for reuse. She is also an active member of Emerge Broward, a young professionals group which happens to be full of Florida Gators.

2009

Steven Rushing, B.S. MAE
is attending Vanderbilt University Law School with a focus in patent law.

David Tumblin, M.S. ISE
is a systems engineer with DRS Tactical Systems, Inc. in Melbourne, Fla.

MARK LAW WAS NAMED ASSOCIATE DEAN FOR ACADEMIC AFFAIRS IN AUGUST

Law, who holds master's and doctoral degrees in electrical engineering from Stanford University, spent the past six years as chair of the DepartmentofElectrical & Computer Engineering. He came to the University 21 years ago as an assistant professor. Before UF, Law worked at Hewlett-Packard from 1982 to 1985. On top of an impressive battery of awards bearing his name (everything from National Science Foundation Presidential Faculty Fellow to Iowa State Outstanding Young Alumni to College of Engineering Teacher of the Year to UF Research Fellow to IEEE Fellow). Law has written more than 200 papers on process and device modeling and has advised 17 Ph.D. students. He has had a part in nearly $15 million of research funding throughout his career.

COURTESY OF ENGINEERING COMMUNICATIONS AND MARKETING

FACULTY UPDATES

NSF CAREER, PECASE and YIP awards are the most prestigous honor bestowed on young reserachers

CAREER AWARDS

CISE
Tamer Kahveci
won a CAREER award for developing mathematically sound algorithms for comparing two pathways so the entities that map are functionally, homologically and topologically similar.

CISE
Alper Üngör
won a CAREER award for combining the strengths of theoretical algorithms (time complexity, output size optimality, and quality guarantees) and practical heuristics (ease of implementation, performance in practice, scability).

ECE
Jing Guo
won a CAREER award for engineering graphene for integration of communication, data storage, and imaging functionalities into existing integrated circuit technologies, and significantly extend the chip capacity through functional diversification.

ECE
Tao Li
won a CAREER award to construct new foundations for many-core scale architecture analysis, modeling and optimization.

ECE
Liuqing Yang
won the CAREER award to establish distributed data storage and collection mechanisms to optimize the ACOustic Underwater Sensor NETwork performance.

MAE
Andreas Haselbacher
won a CAREER award to produce predictive simulations using innovative numerical methods and minimal empiricism to understand the physical processes that govern mixed flow/powder snow avalanches

MSE
Michele Manuel
won a CAREER award to increase the room temperature ductility of magnesium alloys through nano-particle reinforcement.

PECASE

ECE
David Arnold
won a PECASE award to find new and better ways to make and use "magnetic microsystems" – tiny devices that can act as switches, pumps, valves or perform other functions – for industrial, medical, military and consumer products.

MSE
Jacob Jones
won a PECASE award to establish a new framework to investigate the relationship between structure and macroscopic properties of piezoelectric ceramics in the time domain. This will be accomplished by developing time-resolved stroboscopic data collection.

YIP

CISE
My T. Thai
received the DoD YIP Award for her research proposal entitled "C-WMD: Models, Complexity, and Algorithms in Complex Dynamic and Evolving Networks."

ISE
Vladimir Boginski
received the DoD YIP Award for his research proposal "New Robustness Characteristics and Phase Transition Problems for Complex Networks in Dynamic and Uncertain Environments."

MAKING THE BEST OF HARD TIMES

Successful companies and individuals know investing in the future is never an option, but a necessity.

While it may be tempting in today's very challenging economic climate to apply our resources solely to today's priorities, we must continuously think about what we are doing to nurture an environment for future opportunity and success.

I believe a key part of our return to economic stability lies in rejecting hasty reactions and having confidence and optimism that our nation will recover from this recession and be even better than before. When that time comes, we will need the skills of many talented, well-educated individuals on whom we can rely for the continued success and growth of our businesses and communities.

Harris Corp. has a lengthy record of commitment to supporting educational programs at all levels, especially in the areas of math and science. We are especially proud of our long association with the University of Florida and are honored to count some 850 UF graduates among our talented employees.

Instead of reducing our financial support of educational initiatives during this recession, I think that right now is actually the very best time for us to invest in the future of our companies and – by extension – the state of Florida. To that end, Harris is providing a $3 million gift to create the Harris Gateway to Learning & Innovation in the University of Florida's College of Engineering, Computer and Information Sciences building.

The Harris Gateway is aptly named, in that it will provide a 'door' to many benefits. It will support the recruitment and development of outstanding faculty, enhance industry partnerships, create a dynamic educational model, produce better scientists, and play a key role in recruiting outstanding students to UF.

Times of economic uncertainty do have some benefits. One is that they force us to focus on what really matters. At Harris, we know that our investments in education and university partnerships pay dividends many times over. These initiatives are helping to ensure development of a highly skilled and diverse workforce that will carry Harris and other companies into the future, well past this recession.

I encourage you to share our vision of optimism and continue to invest in higher education.

Howard Lance
CEO and president, Harris Corp.

SAVE THE DATES...

Nov. 6-7, 2009
College of Engineering Centennial Kickoff

Friday
Centennial 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.

Saturday
Gator Engineering Tailgate Reunion
Three hours before kickoff of the UF vs Vanderbilt football game.

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

Nov. 19-21, 2009
Grand Guard Reunion
Join us for a festive weekend of events honoring the Class of 1959 and all prior years, hosted by the University of Florida Alumni Association.

For more info: www.ufalumni.ufl.edu
or call 352-846-3580 100years.eng.ufl.edu

To find out how you can help the College contact: **MEG HENDRYX** | Senior Director of Development | mhendryx@ufl.edu

FRIENDS WE'LL MISS

1924 William H. Keen OCT. 1, 1969 1928 A. L. Clayton Jr. ST AUGUSTINE, FLA., JULY 29, 2009 1931 Edward J. Hill B.S. ME TALLAHASSEE, FLA., DEC. 22, 2004 | Alden F. McDonald B.S. EE PORTLAND, MAINE, AUG. 20, 2009 1933 Clyde A. Brady Jr. B.S. CHE ST. AUGUSTINE, FLA., NOV. 3, 1993 1934 Everard L. Stuhrman B.S. EE DELRAY BEACH, FLA., NOV. 18, 2004 1935 Joel R. Baker B.S. CHE LAUDERHILL, FLA., AUG. 20, 2007 | Henry R. Harper WILMETTE, ILL., DEC. 1, 1987 | Vivian W. Moss Jr. B.S. CHE ST. PETE BEACH, FLA., JAN. 22, 2008 1936 Col. Charles W. Matheny Jr. B.S. CE ZOLFO SPRINGS, FLA., APRIL 30, 2007 1938 Edward L. Bonney B.S. ME OLD LYME, CONN., JULY 23, 2003 1939 Colonel Bert W. Humphries B.S. ME OCEANSIDE, CALIF., FEB. 20, 2006 1940 Wallace F. Armstrong M.S. BATON ROUGE, LA., MAY 15, 2009 | Overby C. Branch Jr. B.S. CHE OCALA, FLA., MAY 30, 2009 1941 Walter F. Taylor B.S. CE ATHENS, GA., DEC. 2, 2002 1946 John E. Lake MSE SCHENECTADY, N.Y., AUG. 22, 2002 1947 Orland M. Brown Jr. M.S. CHE BATON ROUGE, LA., MAY 8, 2009 1949 Christopher W. Holtz B. CE YOUNGSVILLE, N.C., MARCH 5, 2007 | Joel T. Rodgers B.S. ME ST. PETERSBURG, FLA., NOV. 14, 2008 1950 Philip J. Lawson B. IE HILTON HEAD ISLAND, S.C., MAY 19, 2009 1953 Robert C. Watkins Jr. B. CHE BORGER, TEXAS, JAN. 27, 2009 1955 William O. Rowell B. IE LEXINGTON, S.C., MAY 6, 2009 1957 Alfred E. Crosby B. EE GAINESVILLE, FLA., AUG. 9, 2009 | Bobby R. Jacobs B. CE DECATUR, ALA., MAY 15, 2009 1958 James W. Follansbee B.S. ME JAN. 1, 1976 1959 Albert L. Dryden B.S. EE MELBOURNE, FLA., JUNE 19, 2009 1962 Kenneth W. Causseaux B.S. CE SORRENTO, FLA., JULY 30, 2009 | Alton R. McMullen B. EE INVERNESS, FLA., DEC. 14, 2007 1963 David E. Knittle B. ME SAN JOSE, CALIF., MAY 18, 2009 | Fraser D. Smithson B. ME NAPLES, FLA., JUNE 12, 2009 1964 Michael Callahan B. EE ATLANTA, GA., NOV. 21, 2007 1968 Richard J. Adams M.S. MELBOURNE BEACH, FLA., MAY 1, 2009 1971 Kenneth B. Fess M.E. ROSEVILLE, CALIF., OCT. 16, 2004 1975 Ronald W. Meyer M.S. EE ETOWAH, N.C., JUNE 16, 2009 1977 Dr. Thomas H. Culpepper PH.D. CE FAIRFAX, VA., JUNE 27, 2009 1978 Jaime M. Benavides B.S. EAE KEY WEST, FLA., MAY 4, 2009 1979 Dr. Gerald W. McDonald M.E. ISE JACKSONVILLE, FLA., JUNE 16, 2009 | Cheryl H. Watson B.S. CE MECHANICSVILLE, VA., AUG. 5, 2009 1982 Capt. John H. McGugan B.S. EAE MIAMI, FLA., JUNE 20, 2009 1983 James W. Parkes M.S. EE TRENTON, FLA., JULY 22, 2009 1986 David A. Smith B.S. CIS BOYNTON BEACH, FLA., MAY 4, 2007 1987 Thomas P. Acker B.S. CIS LONGWOOD, FLA., DEC. 20, 2000 | Andrew D. Grose III B.S. EE SALT LAKE CITY, UTAH, OCT. 24, 2003 1995 Jeffrey V. Capps B.S. ENS SAINT CLOUD, FLA., JULY 2, 2009 1996 Jeffrey P. Micklow B.S. ENE PORT SAINT LUCIE, FLA., JULY 13, 2009

ILLUSTRATION BY JOHN DUNNE

REFLECT, RENEW, REINVENT

These words aren't in the thesaurus next to engineering, perhaps they should be

There's an undeniable energy on campus each fall. It's a time to reflect, renew, reinvent and even create.

It's the beginning of 1,121 freshman engineering careers; 19 companies looking to 145 Integrated Product & Process Design students to solve their problems in the next 8 1/2 months; 51,000 backpack-laden students getting lost in the maze that is Turlington Hall; 102,000 season-invincible flip-flops spanking the Reitz Union's terrazzo floor (yes, they will be wearing flip-flops when it's 30 degrees); and of course... the return of Gator football's mesmerizing grip on the Gator Nation. But there's also a nostalgia that takes over — especially for the faculty and staff, some of whom are Gators by earned rite, others Gators by proximity.

In the flux of the fall hubbub, hunting for parking, combatting the September love-bug infestation, and putting together this issue of The Florida Engineer, history replaced nostalgia when I came across this gem from 60 years ago, published in the first issue EVER of the magazine:

96 ISSUES LATER... Students first published the FE 69 years ago. It was produced by them until the early 80s.

"The first issue of the FLORIDA ENGINEER is now a reality. We of the staff sincerely hope it meets with your approval. A small group of University of Florida engineering students have worked this past summer to produce this initial copy of your magazine. As we garner more of the talents and efforts of the engineering college student body, we hope to make subsequent issues of the FLORIDA ENGINEER better and better. From you, our readers, we earnestly solicit ideas, articles, criticism and remarks. Let's make the FLORIDA ENGINEER the best publication of its type!"

— Staff note in The Florida Engineer, November 1950

This earnest message reflects the same energy and excitement our small staff and merry band of freelancers feel creating this magazine for you. And even funnier is that it asks for what we still need more of: interaction from you.

So, as the College gears up for its 100th anniversary, many of these pages pay homage to our decorated past through timelines, old photos, good stories, and even the Engineer Update (to which you should contribute). You'll also read how the state of Florida is reestablishing its economy by reinventing itself as technological powerhouse through partnerships with UF and other Florida universities, community colleges and industry. Creation abounds as our new dean, Cammy Abernathy, breaks the mold — not only by becoming the first woman to steer the College, but also as she reexamines how we teach engineering. This summer, just as she was transitioning from associate dean to dean, she was introducing freshman engineers to the tangible side of engineering two years earlier than usual. This is an amazing time for our College. Our history is rich, and our future is brighter than the culmination of flash bulbs when Tim Tebow throws a jump pass. This is Gator Engineering, and I'm thrilled to be along for the ride.

As you (hopefully) enjoy this issue of The Florida Engineer, take a moment to reflect on your time at UF. Renew connections and passions in your own world, or even reach back into this one. Reinvent the routine. And, create... but, well, you already do that — you are an engineer.

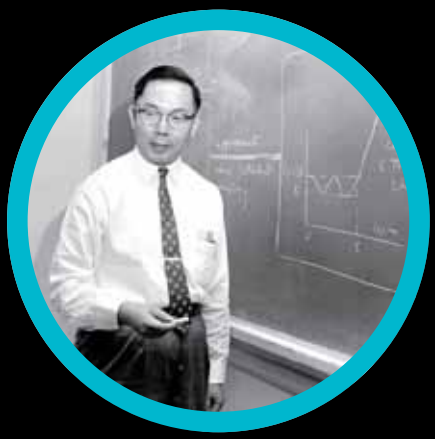
Sincerely,

Nicole C. McKeen

Nicole Cisneros McKeen,
EDITOR | nmckeen@eng.ufl.edu

SHANNON KALAHAR

100 YEARS



of

GATOR ENGINEERING

It's almost here. Join us as we kick off the College of Engineering's year-long centennial celebration, as well as recognize significant anniversaries for some of our departments.

SCHEDULE OF EVENTS

FRIDAY, NOVEMBER 6TH
College of Engineering Centennial
Historical Marker Dedication & Reception
3:30 pm Celebrating 100 Years of Engineering at UF
LOCATION: Center of UF Campus near Walker Hall

SATURDAY, NOVEMBER 7TH
Gator Engineering Barbecue & Reunion
UF vs Vanderbilt football game
Three hours before kickoff
LOCATION: Reitz Union Lawn

REGISTER NOW!

ALUMNI BARBEQUE & FOOTBALL TICKET PACKAGE AVAILABLE
100YEARS.ENG.UFL.EDU

In Spring 2010 look for more about the centennial lectures series on:
Engineering and Health Care | Information Systems | Engineering Education | Nanotechnology

For more information about events go to: 100years.eng.ufl.edu
To register for Milestone Anniversary Celebrations for CCE, ECE, ISE, MAE and NRE, Department tours, presentations and celebration banquets go to: 100yeras.eng.ufl.edu

UF | UNIVERSITY of FLORIDA

UF | College of Engineering
UNIVERSITY of FLORIDA
349 WEIL HALL
P.O. BOX 116550
GAINESVILLE, FL 32611-6550

NONPROFIT ORG
US POSTAGE
PAID
PERMIT NO. 230
PANAMA CITY, FL