enVision MAGAZINE

THE FACE OF A KILLER

By Janet Dawald

This killer is responsible for almost 30% of all deaths from cancer. He moves in quietly, and by the time he is discovered, for most it's too late. He is choosey about his victims, people who have smoked are favorites but exposure to second-hand smoke is good enough. He was getting worried, though. Smoking in the United States was going down, but that seems to have leveled off and may be rising, especially among kids. That's good for business.

Meanwhile, he targets more women who have never taken a drag in their life. Our killer claims that's a bum rap, that's a different guy, but don't be fooled. Lung cancer is the most deadly form of cancer, and your survival rate is a dismal five years.

National expenditures for lung cancer are over $10 billion a year. But lung cancer, he doesn't care.

Cigarette manufacturers, spend almost dollar for dollar in advertising and promotion in a year. A dollar to get you hooked; a dollar for that X-ray with the fuzzy white area in the old lung. It's a good deal.

Lung cancer tumors are masters of disguise. They can look lumpy and like a potato, or float like a gossamer cloud. Don't think you can pick him out of a line-up, either. The tumor can look totally different in Stage I, where you have a fighting chance, to Stage IV, where you don't.

FILM TO DIGITAL: While chest X-rays were the standard for lung cancer detection for several decades a new type of three-dimensional digital system became widely available in 1980. Called Computed Tomography (CT), or "CAT scanning," the results were a quantum leap in lung cancer detection. In CT and PET, an X-ray scans a single narrow slice through the body and a digital image of that slice is created. Hundreds of slices are then digitally stacked in the proper order, like a deck of cards. Then a three-dimensional image is created that can be rotated, expanded or sliced again on a different plane.

In 2010, the National Cancer Institute wanted to find out exactly how the old X-ray compared with the new CT imaging system. The results, released last June, showed that participants who received low-dose helical CT scans had a 20 percent lower risk of dying from lung cancer than participants who received standard chest X-rays. The killer is now in plain sight, but we are still too late.

A lot has happened in computers, imaging, CT/PET technology and research since 1980. In Florida, a lot happened in cancer research. The H. Lee Moffitt Cancer Center opened in 1986 on the USF campus. In the 1990's then Florida governor Lawton Chiles, Jr., successfully filed charges against the tobacco industry, and Florida was awarded $11.3 billion. The interest on part of this settlement, plus extra revenues from a tax on cigarettes helps fund the James and Esther King Biomedical Research Program.

This year, Moffitt and the Research Institute, and the College of Engineering's Computer Science and Engineering Dept. have been chosen by the King Program as the recipient of a $1.275 million grant for screening healthy lungs. Their task will be to take pictures of lungs that do not yet have cancers and create a database that will be used in the future to contrast with lungs that eventually develop cancer.

"The purpose of the grant is to develop new image analysis techniques that we believe will allow us to better identify patients at high and low risk of developing cancer in the future," says Principal Investigator Robert Gillies, PhD.

The USF campus seems an unlikely place to find a killer. He came in with over 400 lung cancer patients admitted to Moffitt who underwent a new kind of high resolution CT scan. These patients are a test group that is sharing the images of their lung cancer tumors with researchers at USF. The images are being cataloged by size, shape, texture, borders and genetic makeup. It is a database of killers.

All that intensive computer processing and image analysis is the science of radiomics, and is specifically used on the three-dimensional digital images created by CT and PET scanning. Not to be confused with radiology, which uses descriptors such as "irregular borders" and "central necrosis" on two-dimensional film, radiomics can provide hundreds of objective and quantitative anatomical and functional information about lung tumors in three dimensions.

THE GOOD GUYS: Computer Science & Engineering Department Chair Larry Hall, PhD, and Associate Chair Dmitry Goldgof, PhD, part of USF/Moffitt's led by Dr. Robert Gatenby and Gillies USF/Moffitt Team consists of radiologists, imaging specialists, oncologists, physicists and information technology experts who are using radiomics to track non-small cell lung cancer tumors (NSCLC). Basically taking mug shots of the tumors, the resulting database will provide a "lineup" of thousands of images of lung cancer tumors.

The Moffitt team is just one site of the larger Quantitative Imaging Network (QIN). This network is one of several under the Cancer Imaging Program (CIP), part of the National Cancer Institute. The CIP's goals are to promote and support cancer-related research in imaging sciences and technology, and integrating these discoveries into the understanding of cancer management and risk. The Moffitt/USF team's expertise in qualitative analysis of non-small cell lung cancer and the powerful databases that have been developed at Moffitt/USF and at a sister site in the Netherlands qualified the team for this prestigious position with the QIN.

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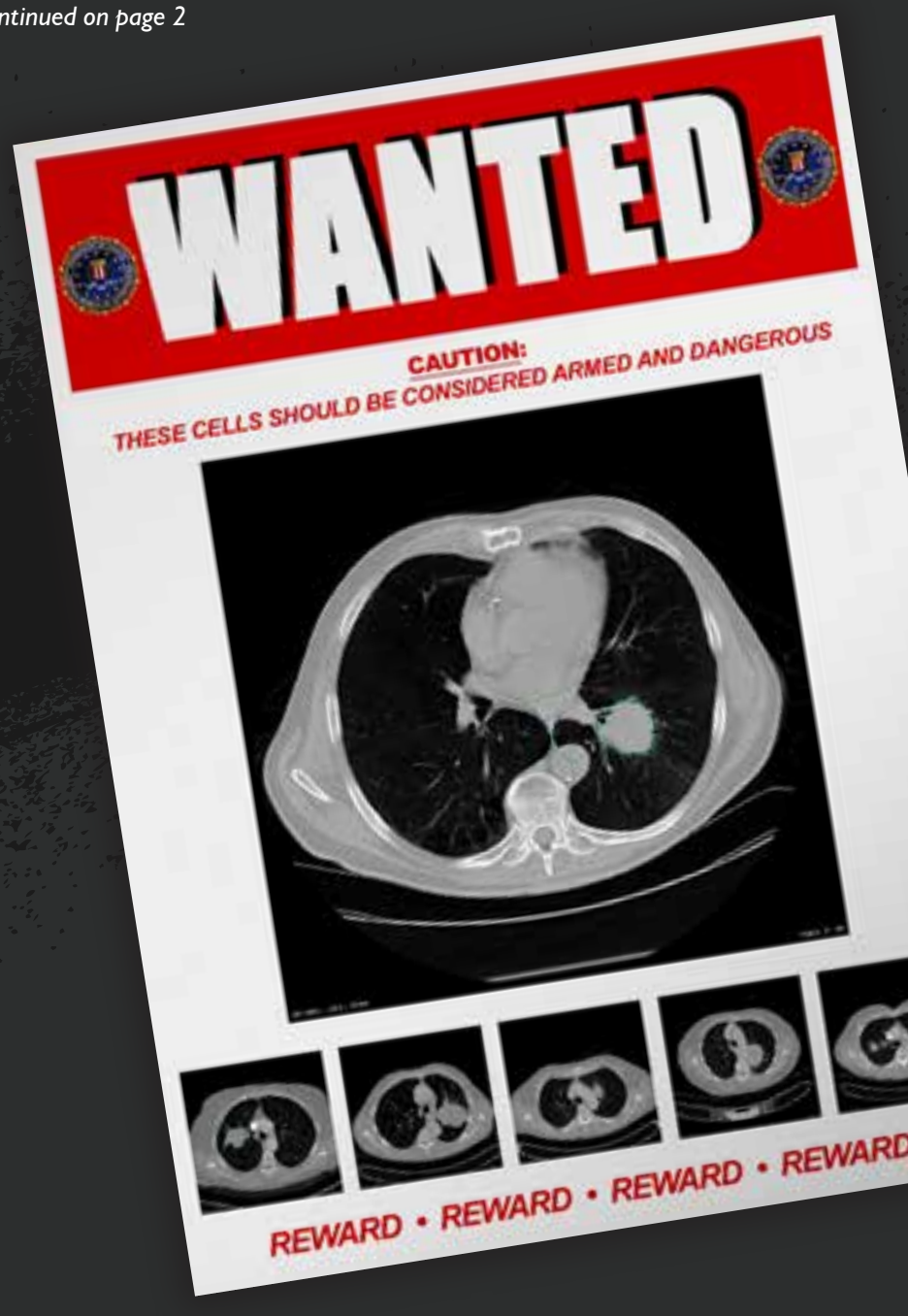

Currently, the QIN consists of the USF/Moffitt team, Stanford University, University of Pittsburgh, University of Washington, University of Iowa, Vanderbilt University, Brigham & Women's Hospital (Harvard), Oregon Health & Science University, Johns Hopkins University and Massachusetts General. QIN is remarkable in that its researchers, databases and facilities are distributed across the country, and great effort is put into monthly teleconferencing, network-ready processes such as consensus publications, cross-network activities and semi-annual face-to-face meetings.

Professor Goldgof is an expert in computer vision, pattern recognitions and biomedical image analysis in CT, MR and PET images. The other computer science team member, Professor Hall, brings machine learning, extreme data mining, bioinformatics, pattern recognition and artificial intelligence to the table.

"I had no idea how deadly this cancer was until I got into this project," explains Goldgof. His enthusiasm for the radiomics project is evident as he speaks about his part in taking down this deadliest cancer.

THE BAD GUYS: "Lung cancer is not a single disease, but a collection of diseases," Goldgof explains, knowing precisely where to start this lesson. "And each version of the disease has various genomic signatures, some of which are treated best with chemotherapy or radiation. A biopsy gets a small piece of tissue," he warns, "but a cancer tumor is not a homogenous structure, so depending on where you perform the biopsy you can have different results." Basically, cancer is a disruption of the genes that regulate cell growth that results in deadly mutations. So, different genes in their uncontrolled growth and gene expression create different kinds of tumors. And different kinds of tumors in a three-dimensional image look different from each other. "We can compute 200 different indices or descriptors on these tumors," explains Goldgof, "so you have to have a sufficiently large and detailed database."

One of the most difficult aspects of tumor identification, even in three dimensions, is that the tumor can look different at various stages. If discovered at Stage I, a patient has a better chance of survival than at Stage IV. Treatments, such as chemotherapy or radiation, must be matched with which stage the tumor is in. That means the images and techniques for finding them in a database must be multidimensional and fluid, which increases the complexity of the databases by several magnitudes.

HUMAN FACTOR: Radiomics is not a totally automated system, but depends on many critical human interventions. For example, the various CT machines must be tuned to the appropriate CT/PET scan parameters so that the resulting tumor images are uniform, and that all images loaded into the database are the right size and resolution. Next, a medical professional outlines the tumor and submits it to various algorithms that segment the tumor and establishes boundaries. Texture, size and other features are then carefully considered. The results are tested against human readers, against other images and even against itself.

"This is a very unique group of people," Goldgof says thoughtfully. "They will take this technology and will extend it to breast cancer and renal (kidney) cancer, which has its own challenges. We have very specialized databases for testing, and for data mining of patients who had Stage IV cancer. We are using powerful imaging software from Germany, all of these are good things, many answers will be coming at the end of the five years." He pauses for a moment, and then adds, "Many good things."

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Message From The Dean

Photo courtesy of CAE

Dean Wiencek behind the controls of a C-130J trainer at CAE (cae.com).

Welcome friends and family of USF Engineering to another issue of enVision. The College of Engineering continues to move forward with confidence despite the continuing economic difficulty. Our success is rooted in partnerships, focus and communication. This magazine is just one facet of the complex task of maintaining and enhancing communication. Our strategic plan has become a solid framework that guides our decisions, actions and accountability. But in the short space I have here, I want to emphasize the importance of partnerships. The College of Engineering has a long history of collaboration with entities in the region, the state, nationally and internationally. One such partnership that has provided great benefit to the College and the State is the Florida High Tech Corridor program. A separately funded entity from the State of Florida, it provides matching grant support for research conducted in support of Florida businesses with a special emphasis on collaborations with small businesses. We are now looking to establish new partners in the community. Chromalloy is a good example of a medium size business with a long history in the Tampa Bay region. Prior to this last year, we were doing little with this company but we have since established a vigorous internship program with Chromalloy, have worked on a small research project and are about to sign a business plan to provide ongoing technical support in materials characterization. Likewise, we are focused on developing a strong partnership with the local defense related entities, both governmental and private. Tampa enjoys the privilege of having three separate defense establishments co-located in the heart of the city; namely, Central Command (CENTCOM), Special Operations Command (SOCOM) and MacDill Air Force base. The faculty and my staff have been vigorously engaging and networking in this regard. The inset photo was taken during my visit to CAE USA, a Tampa company that develops and manages simulated training environments. I actually landed a C-130 without crashing, but I must admit we all bounced two or three times during the landing. I maintain that the past and the future of the USF College of Engineering is deeply rooted in these partnerships. I feel blessed to have the help of the USF administration in establishing, nurturing and growing these relationships. I am especially grateful to Rick Baker, former mayor of St. Petersburg and the Vice President for Public Policy and Innovation Partnerships at USF. I hope you, the friends and family of the USF College of Engineering, will reach out to us if you feel there is a potential for a mutually beneficial partnership. We enjoy envisioning possibilities and we love to turn those visions into reality.

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MISSION STATEMENT

The mission of the College of Engineering at the University of South Florida is to improve the quality of life in our community by providing a high quality education for our students and practicing professionals; by creating new knowledge and solving real world problems via innovative research; and by engaging in effective community service and outreach.

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USF UNIVERSITY OF SOUTH FLORIDA
COLLEGE OF ENGINEERING

Experiential Learning

Internships and co-op opportunities are a very important part of a student's engineering education. Experiential learning involves hands-on work or research activities that apply classroom theory to real-world problems. Many companies are providing priceless work experiences for our students. Here are some recent expamples.

National Defense Industrial Association

This year, the NDIA chapter partnered with the USF College of Engineering to identify nearly a dozen undergraduate and graduate students eager to commence their career providing innovative solutions to the Special Operations Defense Industry. Several of our corporate members considered these candidates as summer interns for leading or participating in Independent Research & Development (IR&D) projects that directly accelerate special operations.

Mr. Mike Weber of Novonics Corporation and Dean John Wiencek, congratulate Mr. Bryce Hotalen

Mr. Mike Weber of Novonics Corporation hired USF intern, Bryce Hotalen, to lead an electronics engineering integration of their combat simulation software. This solution will directly support U.S. special operations and law enforcement personnel and help save friendly forces and noncombatant lives. Welcome to the Special Operations Defense Industry community Bryce!

Oldsmar-based QTM Incorporated which specializes in precision machining, welding, fabricating, and abrasive waterjet machining for a wide variety of industries provided internships for mechanical engineering students Abigail Lambert, Matthew Reno, Sean Motta, Joshua Kowzan.

Humberto Gomez, a doctoral candidate in the Department of Mechanical Engineering, received a prestigious internship with the General Motors Global Research and Development Center in Warren, Michigan.

Chemical Engineering undergraduate Trishelle Copeland-Johnson received a 10-week internship through the Society of Chemical Industry (SCI) Scholars Program. She interned this summer with Air Liquide, Inc. in Newark, Delaware with a research project focused on the development of algae-based biofuels.

Paula C Algarin-Amaris, a doctoral student in the Department of Electrical Engineering, conducted a 12-week internship at Novellus Systems Inc. in San Jose, California, working as a Process Development Engineer focused on ALD and CVD deposition for contact metallization in memory and logic devices.

2011 Global Sustainability Conference Hosted by USF

By Desa Philadelphia

A record attendance (400+) from around the globe gathered at the University of South Florida (USF) in July, for the 2011 Association of Environmental Engineering and Science Professors Education and Research conference, the association's flagship event for discussion of novel research and educational activities.

Themed *Global Sustainability: Implications for Research, Education, & Practice*, the conference featured 13 pre-Conference workshops, three presentations from invited keynote speakers, 140 poster presentations, more than 100 oral presentations, and a session on integrating sustainability into engineering practice co-organized with the American Academy of Environmental Engineers. Conference organizers also stressed a salient goal of the gathering was for integrated participation of all attendees in order to encourage and facilitate discussion within and between academic and practitioner communities. The enthusiasm of those attending signified the commitment of the AEESP membership to the continued development of a community built on respect and a determination to see rapid growth in the environmental field.

For more information on this exciting conference and to see the list of awards, go to Extra Envision. www.eng.usf.edu/extraenvision

This summer and fall the College of Engineering has been busily renovating areas of the Engineering II, including the Hall of Flags.

To access the Virtual Hall of Flags go to: www.eng.usf.edu/hallofflags

For more information on the renovation and to see architect's renderings to to www.eng.usf.edu/renovation.

Or download a QR code reader app for your smart phone and then snap this.

student profile

Andrea Rocha

Andrea Rocha

PhD candidate, Engineering Science – Civil & Environmental Engineering

Why did you decide to pursue a PhD and what are your career goals?

After completing a BS in Biology and an MS in Ocean, Earth & Atmospheric Sciences, I decided to continue on toward my PhD in Engineering Science to obtain the research skills necessary to compete for a job in a government agency or federal lab."

How have you received interdisciplinary training in your PhD program?

"I was recruited to USF and due to my research interests in bioremediation. Hence, as a non-traditional engineering student, it was natural for me to have a PhD project that is interdisciplinary.

How have you integrated outreach activities into your PhD program?

I have participated in activities focused on broadening participation of underrepresented groups in science and engineering. For two years, I was a student representative on the board of directors for SACNAS, an organization dedicated to helping Latinos and Native Americans pursue graduate degrees in science, engineering, and mathematics. This past year, I was a panelist at the SACNAS National Conference in Anaheim and also served on a graduate student panel at a conference sponsored by NSF.

Describe the intellectual merit of your PhD research and its broader impact.

For my dissertation research, I am developing an integrated computational-systems biology approach to identify conserved metabolic systems related to expression of specific phenotypes essential for optimal microbial production of hydrogen using dark fermentation processes. Discovery of metabolic pathways and networks are essential for further understanding of metabolic processes involved in hydrogen production and to improve upon current technological applications for optimized hydrogen yields.

CUTR PARTICIPATES IN THE SHRP 2 NATURALISTIC DRIVING STUDY

The largest coordinated safety program ever undertaken in the United States

By Dr. Pei-Sung Lin, Ph.D., P.E., PTOE

The Second Strategic Highway Research Program (SHRP 2) was established by Congress to investigate the underlying causes of highway crashes and congestion in a short–term program of focused research. The objective is to identify countermeasures which will significantly improve highway safety through an understanding of driving behaviors. The study will incorporate approximately 3,100 drivers in six states throughout the United States.

CUTR's Significant Role for the Study at Tampa Bay Site

Through the first run of Request for Qualification (RFQ) and the second run of Request for Proposal (RFP), both highly competitive processes, the Center for Urban Transportation Research (CUTR) at the University of South Florida (USF) and its partner CUBRC, from the State of New York, were awarded a $3.5 M project by the National Academies of Science for their proposed Tampa Bay site. CUTR obtained nearly $1.95 M to conduct this important study.

The major project tasks for CUTR are to obtain an approval from USF Institutional Review Board (IRB) to conduct the study, perform traditional recruitment of drivers, conduct driver assessment, install data acquisition systems (DAS) to participants' vehicles, perform regularly scheduled maintenance on DAS units, and transfer data to Virginia Tech Transportation Institute (VTTI) for secure data storage. CUBRC is responsible for project management, technical support, participant scheduling, data quality assurance, and crash investigation.

This CUTR research team is led by the Principal Investigator, Dr. Pei-Sung Lin, Program Director of ITS, Traffic Operations and Safety. The key faculty members include the following: Dr. Achilleas Kourtellis, Dr. Chanyoung Lee, and Mr. Aldo Fabregas from CUTR; Dr. Yu Zhang, Assistant Professor from the Civil and Environmental Engineering Department; and Mr. Stephen Sundarrao, Associate Director of the Rehabilitation Engineering and Technology Program from the Mechanical Engineering Department.

To cover both urban and rural driving, the study areas for the Tampa Bay site include both Hillsborough and Pasco County. Currently, more than 270 participants have participated in this national study for the Tampa Bay site. It is a historical moment for participants in the Tampa Bay area to participate in the largest naturalistic driving study in the United States. The CUTR research team is actively conducting traditional recruitment for potential participants. Young drivers are especially needed. The information for eligible participants for the SHRP 2 Naturalistic Driving Study is available in the study website: www.drivingstudy.org

Data Acquisition System Installation and Driver Assessment

Data Acquisition System

The installed instrumentation, or data acquisition system (DAS), collects data using a number of sensors and video cameras whenever the vehicle is running. The DAS being used in the study compiles data from the vehicle network, as well as from sensors installed on the vehicle for this study. There are three primary components: the head unit, the main unit, and the front radar. Cameras, sensors, and an incident pushbutton are incorporated into the head unit. The main unit contains a computer unit and hard drive. The front radar is mounted on the front of the vehicle for data collection.

Head Unit

Base Unit

Front Radar

DAS Installation and Driver Assessment

The DAS is installed on a participant's vehicle at the Naturalistic Driving Study facility located at USF Research Park. The installation takes between 3 and 4 hours. The participant is asked to bring his/her vehicle to the research facility to have the DAS installed. While the DAS is being installed on a participant's car, the participant completes paperwork and testing at the data collection location, which should take approximately 2 - 3 hours. A comfortable room is provided for a series of questionnaires and tests to assess the vision, mental ability, and physical ability. The informed consent process is conducted before the DAS installation.

Confidentiality

The data gathered in this experiment will be treated with confidentiality. Shortly after the participant begins the study, the name and other identifying participant information will be separated from the data and replaced with a number. The data will be encrypted (made unreadable) from the moment it is collected until it is transferred to a secure permanent storage location. While driving the vehicle, a camera will videotape a participant's face with some additional space around the head to accommodate any head movements. An example is shown below. Additionally, video cameras will capture forward and rear views, an external view to the right, as well as a view of the participant's hands and instrument cluster. Any further research efforts using identifiable data will also require approval by an Institutional Review Board (IRB).

Compensation for Participants

Compensation will be provided at a rate of $500 per full year of participation, paid in three installments over the year. Semi-annual drawings will also be conducted. Each corresponding participant drawn would receive $1,000. If a participant leaves the study early for any reason, remaining compensation will be prorated.

A four-camera View of a Study Participant in an Instrumented Vehicle

The Product of the Study

It is expected that there will be many follow-on data analyses using all or part of the data for at least 20 years into the future. The massive amount of data collected will be used for all types of research and analyses to quantify the contribution of relevant driver, roadway, vehicle, and environmental factors to the research questions selected and to assess countermeasure implications of the findings. It will support public policy, rulemaking, infrastructure improvements, and other activities, targeted at reducing the fatalities on our nation's roadways.

More Information for the Study

This article is mainly based on the information provided from the SHRP 2 Naturalistic Driving Study. If you are interested in learning more about participating in the SHRP 2 Naturalistic Driving Study, you can visit www.drivingstudy.org or call 1-877-495-1556.

Two Professors Using Sign Language Recognition Technology to the Deaf

By Janet Dawald

Speech recognition is here. Astonishing in its accuracy, or hilarious in its algorithm-driven attempts, the technology is available in your hand, in your car, integrated into toys and probably toasters in the not-too-distant future. But if you are deaf, speech recognition is useless.

"There is no mature technology like speech recognition for the Deaf," explains Computer Science & Engineering Professor Sudeep Sarkar, PhD, "As this technology develops for the hearing world, what happens to the deaf?" Professor Barbara Loeding, PhD, an Associate Professor in Special Education, adds "So many technologies are incorporating voice input – will these devices still include a way for Deaf people to access them as we go forward?"

Professors Sarkar and Loeding are two USF professors devoted to an interdisciplinary approach dedicated to bringing sign language recognition to hearing-impaired and d/Deaf users. Specifically targeting American Sign Language (ASL), they are tackling the complex word of analyzing sign language videos and transforming the graceful hand movements and animated facial expressions of ASL speakers into English text. This unlikely partnership of computer scientist and alternative communication educator have been working for almost two decades to tackle the incredibly complex world of time, motion, expression and movement of ASL.

In 2003 they were awarded a four-year NSF ITR Grant of $397,849 to study continuous sign language sentence videos and apply sophisticated programming algorithms to extract the essence of what is being said. "When we started, most of the work in sign language had been done using special gloves with magnetic markers or different colored fingers so the computer would recognize the hands," explains Sarkar, "Our research overcame this restriction." Most of us can understand, on a very primitive level, how software could extract certain colors or movements from a video, but that is only the beginning. What if the background of the signer was full of shapes and colors, or had movement going on at the same time the signer's hands were moving? And what about lighting and shadows, how hands can turn from dark to light, effectively changing color; how does the software accurately track those conditions? And one of the biggest issues to overcome is the movement that a speaker's hands make when transitioning from one sign to another, called *movement epenthesis*, or ME. In constructing sentences, a speaker's hand will have to move in space from the end of one sign to the beginning of the next. How can software distinguish between an actual sign and ME? And, like, you know, any language, like English or ASL, contains, like, a lot of plain old "junk," spoken words or movements that like, just are so unnecessary.

If you think this might be bordering on the impossible, there is more. All speech recognition software depends on one input – the spoken word waveform. "With video input you have two dimensions," explains Sarkar, "time and space."

In order to understand the complexity of the problem, it is necessary to understand ASL a bit more. The isolated ASL *sign* for "mother" is to spread the five fingers of the right hand out, and tap your chin with the thumb, while keeping the palm/fingers vertical. "Father" is the same movement, only the thumb touches the forehead. These two signs can be stored in a database and retrieved. Therefore the software that captures these two movements must be aware of the speaker's face in space, the size of that face, the angle of the hand, and how to ignore how the hand got there, and even if the fingers are wiggling – which can be described as turning "father" into "dad."

ASL signs are then strung into continuous sentences, with their own grammar structure. Negative, positive and other meaning is derived from the face, eyebrows, the mouth and general expression. The videos of these sentences will always have some ME (and maybe a bit of junk) that the software must deal with. The text output is not true English, but *sign gloss*, which is not a translation but a representation in text form of the signs. It can take several words in English text to describe just one ASL sign. ASL speakers also use *finger spelling*, a manual alphabet, to spell words that do not have a corresponding sign, such as spelling "John" or "New Mexico." So ASL includes an alphabet, signs in a continuous sentence and facial expression to convey a full blown language.

In their quest for speed and accuracy, Sarkar and Loeding have tested and used many computational methods to analyze videos of continuous sentences. The names of these methods reads like a James Bond novel: Hidden Markov Models, Dynamic Programming, Iterated Conditional Modes and Monte Carlo approaches. While Dr. Sarkar, who received his PhD from Ohio State University in Electrical Engineering would happy explain the details of all these methods, we will use the traditional journalistic excuse of "beyond the scope of this article," to describe these incredibly complicated procedures.

Barbara Loeding's experience in sign language began when she was a speech language pathologist in a school for the deaf. "I saw problems between the non-signing society and became very excited when I saw that technology could improve communications," she remembers. Fluent in sign language, she received her PhD from Purdue in Special Education/Augmentative & Alternative Communication. As the Co-PI for the NSF grant, she is involved in building sign databases for use in their current project of creating a video tutor for ASL.

With the wealth of information obtained from the NSF grant, Sarkar and Loeding are embarked on a new project, the Intelligent Sign Language Monitor, funded by the College of Engineering Interdisciplinary Scholarship Program. They are in the process of creating a software package similar to Rosetta Stone™, but for American Sign Language students. Like the popular package, the SL Monitor would video the student's signs, and offer suggestions, point out errors or approve of the student's sign. Becoming fluent in ASL is not the same as a spoken language, and it takes a considerable amount of teacher-student time to become fluent. "If the student could get feedback, such as 'not quite right, you used the wrong hand' or 'you used the wrong handshape' it would be very valuable," explains Loeding. Because such a program needs to have a database of both right and wrong signs, her work in creating the sign databases is critical.

"There are still many problems we have to address," adds Loeding. "Making the system work in real time, ignoring the junk and movement epentheses and background clutter, recognizing facial expression and making the system work across different signers is all part of our work."

Sudeep Sarkar adds: "We would be delighted to establish collaborations across disciplines and universities on this problem. It is a truly multidisciplinary problem that needs computer scientists, sign language experts, sign language linguists, facial expression and movement understanding, and even neuroscientists who are looking into deciphering the neural mechanisms underlying movement comprehension. If our research can help other research endeavors, we would love to hear about that too."

For more information,contact:
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Curious about American Sign Language? Go to "Martha's Vineyard, Deaf Parisians and American Sign Language" at Extra Envision.
www.eng.usf.edu/extraenvision

2011 Heart of Gold Scholarship Luncheon & Awards Program

This year marked the 18th anniversary of Heart of Gold. From its humble beginnings – a handful of scholarships and a small luncheon in the Sun Dome - to 129 students receiving $200,000 in scholarships, this annual celebration is an important tradition at the College of Engineering. Thank you to the 64 generous donors and donor organizations who make all of this possible.

For more event photos at Extra Envision.
www.eng.usf.edu/extraenvision

Or dowload a QR code reader app for your smart phone and then snap this.

SAE students have LOFTY GOALS

By Tom Edrington

In the middle of the University of South Florida campus, inside one of the school's original structures, a group of dedicated young engineering students are having the time of their lives. There are 20-30 of them - bright minds form a close-knit team with vision, ambition, common goals and core beliefs.

They are the members of the Society of Automotive Engineers, another team from the USF campus that is not as famous and well-known as the football team, but every bit as driven, every bit as hungry to push their limits. Over the next eight months they will build their own formula race car. From scratch.

It is a complex process that started this past summer and will run through the 2011-2012 school year. It is a step-by-step process where the team will discover their own strengths and weaknesses. They will get to know each other well. They will add new members, as they do every year. They will court sponsors and basically do everything you'd expect a real-world small business to do.

Every team needs a leader, a driving force and club president Simon Restrepo is the man in charge of the production of the new formula racer. He wears many hats and will be the man in position of ultimate respect and achievement within the team - he will drive the car in competition.

Restrepo's second-in-command is the 2011-2012 team captain Joe Elder. Elder's leadership credo is simple. "Even as team captain, I do grunt work. We don't ask anyone to do something we haven't done ourselves," he explained.

There's the design and production work but like any business, there's the no-glamour tasks like sweeping the shop, painting trailers, cleaning and running errands.

"It's something every new member has to understand," said Kyle Jeffries, a former team captain who is still involved with the project. "This is real world experience equivalent to owning and operating a small business. Our team members will leave here with real world experience and they will have jobs waiting for them," Jeffries pointed out.

In these economic times, with many college graduates struggling to find work in their degree fields, these future engineers toss those concerns aside.

"Just about everyone who comes through here and puts in the time, everyone who learns how to be a valued team member, will have a job waiting for them," Restrepo added. Recruiters from the automotive field, among others, flock to the May formula competitions.

Photo by Robert Storey

The team from left to right is: *Greg Kavan, Simon Restrepo, Kyle Jeffries, Adam Kral, Timothy Hileman, Trey Moore, Ahmad Hares, Jacob Loebenberg, Christian Giron, and Mateusz Malinowski.*

"Representatives from Hyundai, Honda, the U.S. auto makers, formula race teams, will show up looking for new talent," Restrepo said, speaking from experience at previous formula competitions.

The competition itself is the crowning achievement but before that, there's a daunting set of tasks in front of the team. The brain-storming sessions started this past summer. Goals were set and work began on sponsorships and materials that will be needed to produce the car. Once school opened for fall classes, the pace increased.

"We will divide into groups," Restrepo explained. "First we have to get on the computers and start with concept work. There's frame and suspension; ergonomics; brakes; drive train, power train, electrical, cooling system, body aero-dynamics; data gathering and testing."

Before the engine starts for the first time in May, there will be more than 10,000 man hours put in by the team. It will take teamwork, responsibility and old-school work ethic.

"You pay your dues. You have to do that to gain respect of the older members," Jeffries said. "Driving the car is the ultimate reward, the greatest form of respect." That's the privilege Restrepo has earned, along with three other members.

But before the first lap is driven, there will be a lot of late nights and there-in lies one of the greatest challenges for the club. First and foremost, these are

Manjriker Gunaratne

Gunaratne Becomes Civil & Environmental Chair

By Tom Edrington

When the College's Department of Civil and Environmental Engineering needed a new chairman it didn't have to look far.

Professor and Chair William Carpenter retired from the position at the end of June and the man who now leads the department is Professor Manjriker Gunaratne. He is well known within the college, he's a 20-year USF veteran who has watched his department grow tremendously over the past two decades.

"In the mid 80's the focus was on finding faculty members to be the core pillars of research here," Gunaratne explained. "Those numbers grew. With state funding down, the emphasis continued on research and publication. Everyone we recruit comes in to conduct research, find grants, teach and publish. It is the research that helps support us." Gunaratne has solid visions for the future of the department. "I also want to enhance student and faculty interaction with outside companies and in order to do that, we have to increase our activity with the American Society of Civil Engineers," Gunaratne pointed out.

He wants those companies to know more about USF and what's going on within his department. He's also looking inside the campus to find synergy between his department and other disciplines. When the talk turns to Environmental and Transportation Engineering, there is the future and the future means sustainability of resources and innovative means of transportation .

"We have the Patel School for Global Sustainability and the Center for Urban Transportation Research. And we want to forge better relationships among the three," Gunaratne said.

He knows that the next 10 years in the United States will bring a lot of emphasis on renewing the nation's infrastructure and attention to the environment. "I believe our researchers are going to come up with more economic, less intrusive ways to rebuild and rehabilitate our infrastructures," Gunaratne predicted.

It doesn't take long to understand that Gunaratne has a feel for the pulse of his department. He was the interim chairman from November 2001 to December of the following year. He admits his appointment as chairman this past summer "came as a pleasant surprise."

"I know my strong points and I know my limitations," Gunaratne said with a smile. "When you work with 25 PhD's, you listen and you work. We want to be the best, just like every department does, and that takes listening and work."

engineering students, one of the school's most challenging areas of study. School work comes first and that will translate into all the team members learning how to manage their time.

"We've seen many sunrises," Restrepo said with a smile, recalling past experience as the process moves into spring when the sense of urgency rises ten-fold. "After December as spring approaches is when we get the wake-up call," he added.

With USF in the midst of its football season, the SAE team does its share to support Skip Holtz and his Bulls squad. "We're at all the games, we tailgate, we take our bus; we have a good time," Restrepo said as he conducted a tour of "Skoolie" the team's well-traveled road bus, an old converted school bus that has logged more than 80,000 miles transporting the club to competitions.

The bus was made possible by a donation from the late Robert Koski, the founder of Sarasota-based Sun Hydraulics. He took an early interest in the team and the company continues as a sponsor, three years after Koski's death in 2008.

"Our main source of funding is USF Student Government," Restrepo said. "Our other sponsors include the Department of Mechanical Engineering, Bown and Miller Racing Solutions, Alro Metals, Bulls Outfitters, Solid Works and Tampa Bay Steel. We also get help from companies like Piloti. They make racing shoes and boots and they sent us eight pairs. We asked for four. They retail for $200 a pair, so that was really nice for them to do that for us."

Finding sponsors is just another facet of the club's "business." During their time at SAE, the members will get experience in accounting, public relations and communications. Before they head to the working world, they'll have a pretty good idea of how to manage a business venture.

Those other facets of "the business venture" attract students from outside the engineering world. "We have business majors, environmental science majors, some bio-medical science majors in addition to the engineering guys," Restrepo pointed out.

What they all have in common is a desire to learn and they have to be willing to put in long hours when needed.

It also takes time for a student to understand how the process works, how it evolves and how engineering studies play a part in the task. "A lot of times, a light goes off in a team member's mind around the third year," Restrepo said. "That's when they begin to understand what it's all about."

They will also get a better grasp of the team's goals and Restrepo has them set high. He wants the team to race in at least two, possibly three competitions. The first will be in Detroit, May 9-12, the Formula SAE Michigan. There's a second in Canada, the Formula North Ontario, May 24-27 then hopefully a third in Lincoln, Nebraska, June 20-23.

Restrepo's goal is finishes in the top 20 and that appearance in Canada, which would be a first-ever international event for USF. Beyond that, he wants a European appearance in 2013 at a Formula Student event in either Germany or England, if the team can raise enough money through donations and sponsorships.

Lofty goals but keep in mind this is no ordinary group. These students have an opportunity like no other. And opportunity is what their futures are all about.

For more information and cool photos about SAE, go to: www.usfracing.com

There is passion for the profession when he speaks of his department and Gunaratne's passion also carries over into USF's sports teams. His first passion for sports arose during his growing up days in his home country of Sri-Lanka.

"I'm emotionally attached to all USF teams," he said, laughing at the fact that he bleeds green and gold. "I have a passion for sports. I started playing cricket at age five and have played cricket now for 50 years. That passion for cricket has made me become a fan of the sports that surround me. Here at USF, I love all sports but especially the football and basketball teams."

"USF is more widely recognized thanks to the football program," Gunaratne pointed out. "It helps the entire profile of the university. It helps our department recruit better professors and better students."

While the football program aspires for more national recognition, Gunaratne is no different with his department. "We want to keep improving, doing the things we need to do. I want to encourage growth of our structural and materials areas through the department's investments in sustainability initiatives . I want to put more resources there to put us on a par with the schools that have the strongest programs."

It's all about the future, future growth for the department, future jobs for engineering students and a clear vision. "I think the future is good for our students," Gunaratne said. "Especially as the economy recovers and the emphasis on the environment continues to be an area of importance to the country."

"Our department will get stronger and that's simply good for our students and faculty,"

Gunaratne predicted. "And it's a good thing for our university."

Contact Professor Gunaratne: gunaratn@usf.edu

research

NEWS

Five College of Engineering researchers were issued two patents recently - No. 8,036,679 Oct. 11 for optimizing performance of location-aware applications using state machines and No. 8,045,954 Wireless Emergency-Reporting System. The inventors are: **Barbeau; Sean J.**, **Winters; Philip L.**, **Georggi; Nevine** (all from CUTR), **Perez; Rafael**, **Labrador; Miguel** (both from CSE).

Luther Palmer (CSE) NSF BRIGE, $174,613 "Running Over Rough Terrain - Enhancing Biological Hypotheses."

Ryan Toomey (CHBME) NSF $80,000 "EAGER: Dually Photocrosslinkable and Photolabile Polymers for Fabricating Heterogeneous 3D Structures."

Yicheng Tu (CSE) and **Bo Zeng** (ISME) NSF $266,440 "Collaborative Research: Making Databases Green - An Energy-Aware DBMS Approach."

Rasim Guldiken (ME) NSF $199,908 "EAGER: A Surface Acoustic Wave Device for High-Resolution Atherosclerotic Plaque Inspection."

Rudy Schlaf (EE) and **Jing Wang** (EE) NSF $299,998 "GOALI: Efficiency Enhancement of Solar Cells Through Electronic Structure Design."

Xiaoning Qian (CSE) and **Bo Zeng** (ISME) NIH $173,613 "Identifying Risk Factors and Interactions for Type 1 Diabetes in Large Studies."

Vijay Jain (EE) U.S. DOE $848,972 "3-D Intelligent Sensor System on a Chip for Massive Deployment for Non-Proliferation Remote Sensing."

Sarina Ergas (CEE) and **Jeff Cunningham** (CEE) NSF $64,000 "Collaborative Research: Development and Testing of a Fundamentals of Environmental Engineering Concept Inventory."

Nathan Crane, **Rasim Guldiken** and **Alex Volinsky** (ME) NSF $354,121 "Large Stroke Microscale Actuators Based on Electrowetting."

Two prestigious grants were recently awarded for thermal energy storage (TES) research to Prof. **Yogi Goswami**, director of the USF arm of the Florida Energy Systems Consortium (FESC), and co-director of the USF Clean Energy Research Center (CERC) and co-PIs CERC Director Prof. **Lee Stefanakos** and Mechanical Engineering Prof. **Muhammad Rahman**. E-On International granted $814,108 for "Innovative Latent Thermal Energy Storage System for Concentrating Solar Power Plants." US DOE granted $1.03M for "Development and Demonstration of an Innovative Thermal Energy Storage System for Baseload Solar Power Generation."

Yicheng Tu (CSE) NIH $875,262 "Database-centric Data Analysis for Molecular Simulations."

Dmitry Goldgof (CSE) and **Larry Hall** (CSE) NIH/SBIR $799,812 (USF subcontract $309,842) "A Fully Automatic System for Verified Computerized Stereoanalysis."

Mark Jaroszeski (CHBME) National Institute of Allergy and Infectious Diseases: $400,000 "Development of Streamed Ion Deposition for Efficient Plasmid DNA Delivery" and $367,500 "Topical Charge Driven DNA Delivery to Skin." Co-PI **Drew Hoff** (EE) and **Dr. Ken Ugen** USF College of Medicine.

Kyle Reed (ME) NIH $102,000 "Gait Enhancing Mobile Shoe for Rehabilitation" Co-PI **Amy Bastian** Kennedy Krieger Institute.

Biomedical Engineering Program Reaches CRITICAL MASS

By Janet Dawald

"Yes, we do have critical mass in the Department of Chemical and Biomedical Engineering," explains Professor Robert Frisina, director of the Biomedical Engineering program. The department has gone from one professor five years ago to an impressive lineup of 10 faculty members – a reflection of the STEM commitment on the part of the State of Florida and the leadership of the College of Engineering. "Florida recognized that they are not going to make it in terms of the state economy by just tourism and agriculture," says Frisina. The state emphasis on STEM (Science, Technology, Engineering and Mathematics) was influential in the College of Engineering's expansion of the biomedical engineering program. "We do all the STEM sciences in biomedical engineering," he adds with pride. When medical schools are laying-off employees, the College is putting more resources into its engineering programs. His enthusiasm for his profession is evident. Frisina lays it out: "We offer good labs, good equipment for startup, nationally competitive packages and graduate student stipends," he adds, "not to mention that USF is one of the fastest growing research universities in the country."

The U.S. Department of Labor's "Bureau of Labor Statistics Occupational Outlook Handbook" lists biomedical engineering as the fastest growing engineering career, destined to grow 72% by the year 2018. Ironically, the health care crisis may inflate this percentage as the population ages, the quality of life for seniors is improved, and as health insurance premiums become prohibitive to more people. Biomedical engineers and other interdisciplinary sciences like mechanical engineering are working on making drugs, treatments and even artificial ears, eyes and limbs that are cheaper and more available than they are now.

cri•ti•cal mass (noun)

A sufficient amount of people and ideas required to create momentum in a system that becomes self-sustaining and creates further growth.

With obvious pride, Frisina introduces three new faculty that will continue the momentum and future growth of the biomedical engineering program.

Piyush Koria, PhD

Tissue engineering is a way to regenerate new cells using proteins and molecules. Primarily used for wounds that don't heal, or for burn victims, Koria is working on ways to repair human tissue. Regenerative medicine, such as tissue creation, also has exciting possibilities in making or repairing nervous systems – one of the holy grails of medical science. Koria comes to USF from Massachusetts General Hospital Center for Engineering in Medicine. While there, he pioneered the fabrication of nanospheres containing keratinocyte growth factor to heal the wounds of diabetic mice.

Anna Pyayt, PhD

A CIFellow (Computing Innovation Fellow) at Stanford University, Pyayt combines electro and micro systems to create devices that can be implanted under the skin. These devices can monitor various blood values and bodily functions and send them back to a medical center or to the patient's cell phone. Recent publications include using electro-optic polymers for the fabrication of field-induced guiding.

Christopher L. Passaglia, PhD

An associate professor from Boston University, Passaglia's research lies in the processing and transmission of visual information. His visual expertise, logically balancing Robert Frisina's audio expertise, expands the department's neuro-engineering capabilities. And like Frisina's age-related hearing disorders, Passaglia specializes in glaucoma, another critical aspect of improving senior's quality of life.

According to Frisina, several professors of chemical engineering in the department are also drawn to biomedical engineering. Associate Professor Norma Alcantar is a good example. She is working with the USF's Byrd Alzheimer's Institute in the College of Medicine. Ryan Toomey, assistant professor, brings his work in materials science to tissue regeneration in collaboration with Assistant Professor Nathan Gallant of the Mechanical Engineering Department. Mark Jaroszeski, an associate professor specializing in drug and gene delivery, adds yet another interdisciplinary approach to the department's depth of expertise.

Robert Frisina's Global Center for Hearing and Speech Research is now settled into its new headquarters in Research Park. "Things are up and running, and all the equipment and furniture are there, and the renovation is done," explains Frisina. The Center, a full-service research institute is funded by several grants, including a five-year Program Project from NIH investigating age-related hearing loss, called *presbycusis*. Frisina and his group are using a unique strain of mice to study hearing loss.

"What we are discovering right now is one of the hormones in the body that controls sodium and potassium, *aldosterone*, declines with age in our mouse colony, and perhaps in all mammals, including humans," Frisina explains. "We are looking at some of the molecular pathways involved in the effects of this hormone decline, especially in the ear. This hormone affects the endolymph, the fluid that is needed for the ear to work. We are currently working out the molecular pathways that underlie this decline." Medication or drugs could prevent this decline, or even reverse the process and restore hearing.

Attracting the best and the brightest is "A lot of work," laughs Frisina. "But as you bring on more, it becomes easier. People see that you are 'for real' and it goes from there." In the Department of Chemical and Biomedical Engineering, the critical mass is definitely "for real."

For more information contact Bob Frisina at rfrisina@usf.edu.

Re-engineering
Engineering Education

By Janet Dawald

"We want our students to be able to hit the ground running," says Jose Zayas-Castro, PhD, "and the Industrial & Management Systems Department is dedicated to that goal." As chair of the IMSE Department, Professor Zayas-Castro is committed to providing a well-rounded engineering education. "Before the space race with the Russians, the Cold War, and Sputnik, engineering education was hands-on," he says. "So for many reasons, the shift in education became more theoretical after those times. The old school of engineering was almost like an apprenticeship students would do things with their hands and then learn the theory."

In 2004 the National Academy of Engineering presented an initiative titled "Educating the Engineer of 2020." Addressing the explosion in technology and global issues, the NAE addressed the challenges that engineering education will face in the future. "Here at USF, we also wanted to blend in more of the soft skills, like writing and presentation, oral communication and entrepreneurial aspects, in addition to more hands-on experience," he explains, which were part of the NAE initiative, "but by no means diminishing or the theoretical aspects of engineering."

Grisselle Centeno, PhD, is an associate professor in IMSE and is one of the department innovators in experiential learning. Her Work Analysis class (EIN 4312C) focuses on fundamental concepts of work measurement and design, which will allow students to improve processes and enhance productivity. She incorporates real-world problems faced by industries based in both manufacturing and service environments. "The idea is to engage students more in the learning process by stimulating them to use their own experiences to gain knowledge," explains Centeno, "rather than providing it through a predetermined method."

One of the most fascinating aspects of Centeno's class is that the case-based activities have been designed in collaboration with industry partners. Some of the industry partners are Walt Disney World (entertainment), Raymond James, Inc, (financial), Publix (food production), the Veterans' Administration Hospital and Moffitt Cancer Center (health care).

Patricia Zarate, PhD, is an instructor and the Engineering Management Program Coordinator. "We want to make our courses more hands-on, more applied to real-world situations," explains Zarate. "We want to enhance their learning experience and have a competitive edge when they graduate from our IE program." She will be teaching Human Factors (EIN4243C) in the spring.

Zarate and Centeno are both working on a logical integration of the Human Factors and Work Analysis courses. They understand that these courses are complementary and can be exposed together as a chain of related topics. "We are working on projects that students may start in the Work Analysis course and continue into the Human Factors course," says Zarate. She plans on working with medical device manufacturers to provide real-world projects for students interested in applying fresh and different perspectives to product design.

Kingsley Reeves, PhD, associate professor, will offer two courses that give students valuable experience in project-based learning. New Product Development (EIN6391) requires teams of students to analyze, design and produce a functioning prototype within the customer's costs and constraints. "Teams have to survey and/or interview their identified markets to determine specific customer needs. Then they must work within those teams to produce a deliverable product," explains Reeves. "Before, the course was taught through a series of lectures, case studies and a final group project. Students were not required to develop a new product themselves, only analyze a product already developed by another firm." One successful outcome of these classes is a new pediatric dental device.

Reeves will also be presenting the Lean Enterprise (EIN5451) class where student teams apply their knowledge within an organization service the community. He works with Lockheed Martin, University Community Hospital, Moffitt Cancer Center and the James A. Haley VA Hospital for this class.

Tapas Das, PhD, professor, had been getting feedback from his students and decided to take a new approach to his Statistical Design of Experiments (ESI4244) class. "One reason for re-engineering this class was that I had received many calls from former students - who did well in this class - asking questions if they could apply 'design of experiments' as a tool to a decision issue they faced at work," recalls Das. "They wanted to know what type of design might be appropriate, how they should conduct analysis and so forth. I realized that the problem lies in the fact that while taking the class the students solved problems that are at the back of the textbook chapters that are focused on data analysis only."

Das realized that the students almost never experience the crucial initial steps of a decision making problem (which are problem definition through data collection) and thus learn only how to conduct data analysis. To address this, he made a real-life design project mandatory for this class, through which the students working in small teams get to experience all the steps of decision making, including writing and presenting a formal report. The teams are composed of both graduate and undergraduate students.

Professor Das' students have gained experience at TECO, working with optimizing the scrubbing process for sulphur dioxide removal at the coal-fired power generation plants. A team is currently working with L3-Communications for improving the X-ray baggage/cargo inspection machines. Other organizations that were involved in team projects include Busch Gardens, Baxter, a VA Hospital, Sun Hydraulics, and Jabil Circuits.

Associate Professor **Ali Yalcin**, PhD, teaches Industrial Systems Simulation (ESI4523). - "In this course we create simulations of real-world systems on a computer and analyze different 'what-if' scenarios to meet specific performance criteria." Yalcin's classes emphasize the independent and critical thinking skills that are expected in the engineering world. "I want my students to walk into a challenge and have the confidence to solve whatever it is," he continues. "I try to teach students to do serious critical thinking and find creative solutions to challenging problems." Yalcin uses Arena® Simulation Software and in the past semesters has specialized in creating a "virtual hands-on experience" in the health care industry.

All these initiatives culminate in the senior Capstone Design course (EIN4891), where Professor Zayas-Castro blends engineering, entrepreneurship, team-work, and oral and written communication, in a rigorous project based learning setting. Students work in teams of 3-4 students in real projects that can come from any venue, private, governmental, not for profit organizations or product innovations developed within USF. "This is as real as it can get in an academic setting. Although sometimes students do not understand the overall purpose, later (after graduation) they come back and tell us how this experience prepared them to hit the ground running."

Future engineering students at USF will find a curriculum tailored to their interests and needs. More labs will be offered, and those labs will involve working on actual projects, either long-range or in partnership with actual industry needs. "I want to expose the students to how things work in the real world. It is a good teaching tool and also prepares them better for job opportunities," explains Zayas-Castro. "We *are* the Industrial and Management Systems Engineering Department – and we educate the leaders and innovators in this field."

alumni&students

ALUMNI NEWS

Congratulations to **Blake Guillory**, PE, ME'91 in civil engineering has been named the new Director of the Southwest Florida Water Management District (SWFMD). His wife, **Marjorie**,ME'91 in civil engineering is also an alum.

Nitesh V. Chawla, '02 PhD in Computer Science and Engineering has been promoted to Associate Professor with tenure in the Dept. of Computer Science and Engineering at the University of Notre Dame. He also received an MS in Computer Science in 2000 at USF.

The Engineering Alumni Association recently won three USF Alumni Association awards – Excellence in Communications; Excellence in Programming; Excellence in Group Organization.

Members of the Class of 1993 stopped by the College recently. Alumni who dropped by for a visit were:

James Mesa, Mike Linden, Joseph Cassidy, Wayne Paugh, Steven Mainardi, Dario Cintron, Perry Logan, Jim Valdes, Jose L. Marquez, Matt Gallagher.

Members of the Classes of 1966-1969 stopped by the College recently. Alumni who dropped by for a visit were:

George Pidick, Richard Fraze, Bill Opp, Luis Sastre, Ken Mathewson, Wayne Abare, Mike Foley, Ray Fleming, Paul Vianey, Wayne Ralph, John Palatinus, Earl Chancey, Bill Greenlees, Ernie MacFerran, Bill VanDyke, Charles Johnson, Jim Divine, Glenn Schneider, Frank Henderson.

Corporate Ambassador of the Year

Gita Iranipour, MS ChemEng '02, PhD '04 receives the traveling trophy from Paul Stevenson, '95 (center right), CAP program director. Joining them are Dean John Wiencek (far left) and Mike Merrill (far right), county administrator.

STUDENT NEWS

Civil Engineering doctoral student **Sujan Sikder** was awarded a Dwight David Eisenhower Transportation Fellowship and a grant through the University Student Scholars Program of the National Center on Senior Transportation (NCST).

Electrical Engineering undergraduate student **Jean Weatherwax** was named a 2011 Goldwater Scholar.

ASME@USF Electrathon Team # 133 took first place in the college division, and third place overall at the Emerald Coast Pensacola Electrathon Classic Race, held April 16 in Pensacola.

Al-Aakhir Rogers ('11 PhD) in the Department of Electrical Engineering received a 2011 prestigious USF Golden Bull Award.

Humberto Gomez, a doctoral candidate in the Department of Mechanical Engineering, received a prestigious internship with the General Motors Global Research and Development Center in Warren, Michigan.

Ransford Hyman, Jr., a doctoral candidate in the Department of Computer Science and Engineering, received a Best Poster Award during the Student Research Poster Competition at the Richard Tapia Celebration of Diversity in Computing Conference in San Francisco in April.

Chemical Engineering undergraduate **Trishelle Copeland-Johnson** received a 10-week internship through the Society of Chemical Industry (SCI) Scholars Program. She interned this summer with Air Liquide, Inc. in Newark, Delaware with a research project focused on the development of algae-based biofuels.

John Shelton, a doctoral candidate in the Department of Mechanical Engineering, received second place for best oral presentation during the Graduate Student Technical Exhibition Competition at the 2011 National Society of Black Engineers (NSBE) Annual Conference held in St. Louis, Missouri, in March.

Six College of Engineering graduate students have been awarded 2011-2012 Graduate Student Success (GSS) Diversity fellowships from the USF Graduate School: **Henry Cabra** - PhD student, Department of Electrical Engineering; **Vinicio Carias** - PhD student, Department of Chemical and Biomedical Engineering; **Yolanda Daza** - PhD student, Department of Chemical and Biomedical Engineering ; **Alescia Malone**– PhD student, Department of Computer Science and Engineering; **Ana Rioja**– MS student, Department of Chemical and Biomedical Engineering; **Innocent Udom**– PhD student, Department of Chemical and Biomedical Engineering.

Javier Pulecio, ('11 PhD), electrical engineering, and **Huijuan "June" Chen**, ('11 PhD), chemical and biomedical engineering, received Outstanding Dissertation Awards from the Graduate School.

Paula C Algarin-Amaris, a doctoral student in the Department of Electrical Engineering, conducted a 12-week internship at Novellus Systems Inc. in San Jose, California, working as a Process Development Engineer focused on ALD and CVD deposition for contact metallization in memory and logic devices.

Dongping Du, doctoral student in the Department of Industrial & Management Systems Engineering, won first place in the IBM Best Student Paper competition at the IEEE Engineering in Medicine and Biology Society Conference (EMBC) in September in Boston.

Julio Aguilar, Ph D student in Civil Engineering, co-advised by Prof. Gray Mullins and Prof. Rajan Sen, made a presentation on his research at the SAMPE International Conference, Long Beach, CA, May.

USF Wins Big Again at the Big Beam Contest

USF teams from the graduate Pre-stressed Concrete Design course (Spring 2011) won first place in the Southeast (PCI Zone 6) for the fourth year in a row and finished second overall. USF also won the national award for the best report for the second time in three years. In addition, PCI Zone 6 USF has placed first or second three of the last four years in Zone 6 an outstanding accomplishment, considering GA Tech and Florida compete in this zone.

First place:
University of South Florida Team 1

Faculty advisor: Rajan Sen, PhD, P.E. PCI producer: Standard Concrete Products Inc., Tampa, Fla. (John Robertson) **Student team: Yanko Castellanos, Matthew Durshimer, Kevin Johnson, Joseph Ross, Gary Spicer, and Kyle Yeasting**

Second place:
University of South Florida Team 2

Faculty advisor: Rajan Sen, PhD, P.E. PCI producer: Standard Concrete Products Inc., Tampa, Fla. (John Robertson) **Student team: Nick Green, Angelica Osorio, David Bissessar, Joseph Guagliardo, and Virgil Versaggi**

National Rankings

Second place:
University of South Florida Team 1

Faculty advisor: Rajan Sen, PhD, P.E. PCI producer: Standard Concrete Products Inc., Tampa, Fla. (John Robertson) **Student team: Yanko Castellanos, Matthew Durshimer, Kevin Johnson, Joseph Ross, Gary Spicer, and Kyle Yeasting**

faculty&staff

Best Report

University of South Florida Team 2

Faculty advisor: Rajan Sen, PhD, P.E. PCI producer: Standard Concrete Products Inc., Tampa, Fla. (John Robertson)
Student team: Nick Green, Angelica Osorio, David Bissessar, Joseph Guagliardo, and Virgil Versaggi

The College conferred 378 degrees in May: 271 BS; 90 MS; and 17 PhD.

Outstanding Graduating Seniors Spring 2011

Chemical Engineering
Phillip Thomley

Civil Engineering
Muhammad Naeem

Computer Science & Engineering
Jeffrey Cama

Electrical Engineering
Juan Isaza

Industrial Engineering
Sara T. Smith

Mechanical Engineering
Sean Motta

FACULTY & STAFF NEWS

Mechanical Engineering Professor Autar Kaw receives the 2011 ASEE National Outstanding Teacher Award from ASEE President and USF Alum Renata Engel, PhD '88.

Top Educator in the Nation

Autar Kaw, professor of Mechanical Engineering, is this year's recipient of the **2011 National Outstanding Teaching Award** given by the American Society for Engineering Education (ASEE), an honor awarded to a single educator each year. Prof. Kaw is author of four textbooks on numerical methods, matrix algebra, composite materials, and programming. Kaw, who is also a Fellow of the American Society of Mechanical Engineers, also received the 2010 Outstanding Teaching Award from the Southeastern Section. Check out his online tools.

Holistic Numerical Methods Institute (http://numericalmethods.eng.usf.edu)

Audiovisual lectures on YouTube (http://www.youtube.com/numericalmethodsguy).

Numerical Methods Guy (http://autarkaw.wordpress.com)

Professors **Dmitry Goldgof** and **Ranga Kasturi**, graduate students **Matt Shreve** and **Joshua Candamo**, and **Deborah Sapper**, senior researcher with the Center for Urban Transportation Research (CUTR) have the most downloaded paper in IEEE Transactions on Intelligent Systems for both October 2010 and December 2010.

Professor **Yogi Goswami**, Co-Director of the Clean Energy Research Center, has been named recipient the 2011 USF Theodore and Venette Askounes-Ashford Distinguished Scholar Award.

Assistant Professor of Civil & Environmental Engineering **Qiong Zhang** is the recipient of the 2011 ASEE-SE New Faculty Research Award.

Mechanical Engineering Professor **Muhammad Rahman** recently received the Distinguished Service Award from the American Society of Mechanical Engineers (ASME).

Redwan Alqasemi, adjunct professor was recognized by ***Inventors Digest*** as one of the six most innovative mechanical engineers in the country in the April issue.

Pei-Sung Lin, PhD, PE, PTOE, FITE, director of ITS, Traffic Operations and Safety Program at USF's Center for Urban Transportation Research (CUTR), received an Excellent Paper award at the International Chinese Transportation Professional Association (ICTPA) 24th Annual Conference & NACGEA International Symposium on Geo-Trans.

Endowed Eminent Scholar and Distinguished Research Professor **Abraham "Abe" Kandel** of the Computer Science and Engineering Dept. received the prestigious Fuzzy Systems Pioneer Award from the IEEE Computational Intelligence Society.

Sylvia W. Thomas, assistant professor in the Department of Electrical Engineering, received a McKnight Junior Faculty Development Fellowship (JFF) for the 2011-2012 academic year by the Florida Education Fund.

Sarina Ergas, associate professor of civil and environmental engineering was elected to Association of Environmental Engineering and Science Professors (AEESP) Board of Directors.

Civil and Environmental Engineering Professor **Rajan Sen** chaired for the International FRPRCS10 symposium, held in Tampa FL in April. He also presented and was a session chair at the ISOPE-2011 Conference, Maui, HI in June.

featured alumni

Kishore Bopardikar –

Co-Founder of Calypso Technology

By Janet Dawald

Kishore Bopardikar, co-founder and President of Calypso Technology, Inc., recalls his days at the University of South Florida with great fondness. Graduating in 1988 with a master's in computer science, the quiet student from India remembers the friends he made in a new country and how the campus was an agreeable transition to the United States. "The USF program was very good," Bopardikar explains, "and it was affordable. That was a big factor for me, and I enjoyed the school quite a bit and learned a lot."

After working as a software engineer for a few years, he became interested in the financial world and how important capital flows were between financial institutions, investors and corporations around the world. With Charles Marston he founded Calypso in 1997, which is headquartered in San Francisco. Calypso is a software provider for global financial companies such as banks and investment firms. The company has 550 employees in 14 locations around the world including New York, London, Paris, Tokyo, and Hong Kong. The company has experienced double-digit growth and currently has 170 job openings.

"I came out of USF with broad training in all aspects of computer science," he explains. "Computer architecture, software, algorithms, robotics, hardware design, I did not focus on one specific area. This gave me a good grounding for things I did later on."

Like many successful entrepreneurs, he now manages people instead of software. He finds working with people fascinating. "Managing people, he muses, "is no different from writing software. It is a design process. You design an organization and how people will think and what they will do in a situation." But what about those famous human variables? "That is good," he responds immediately, "because that is the root of creativity."

Mr. Bopardikar's advice to students of today may be surprising, because it is exactly what many educators are doing at USF. "I would tell them: don't be focused on just the technology. Think of the business aspects of the technology, think of the value, and what that value creates. And always improve on what you do." He pauses and adds, and have fun. "Yes, if you go to work and you are not having fun, change something. When you are having fun, you will excel." Very good advice from a very successful USF graduate.

COLLEGE OF ENGINEERING at the UNIVERSITY OF SOUTH FLORIDA
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Tampa, FL 33620

USF: UNSTOPPABLE
College of Engineering

Brett L. Woods, CFRE
Director of Development

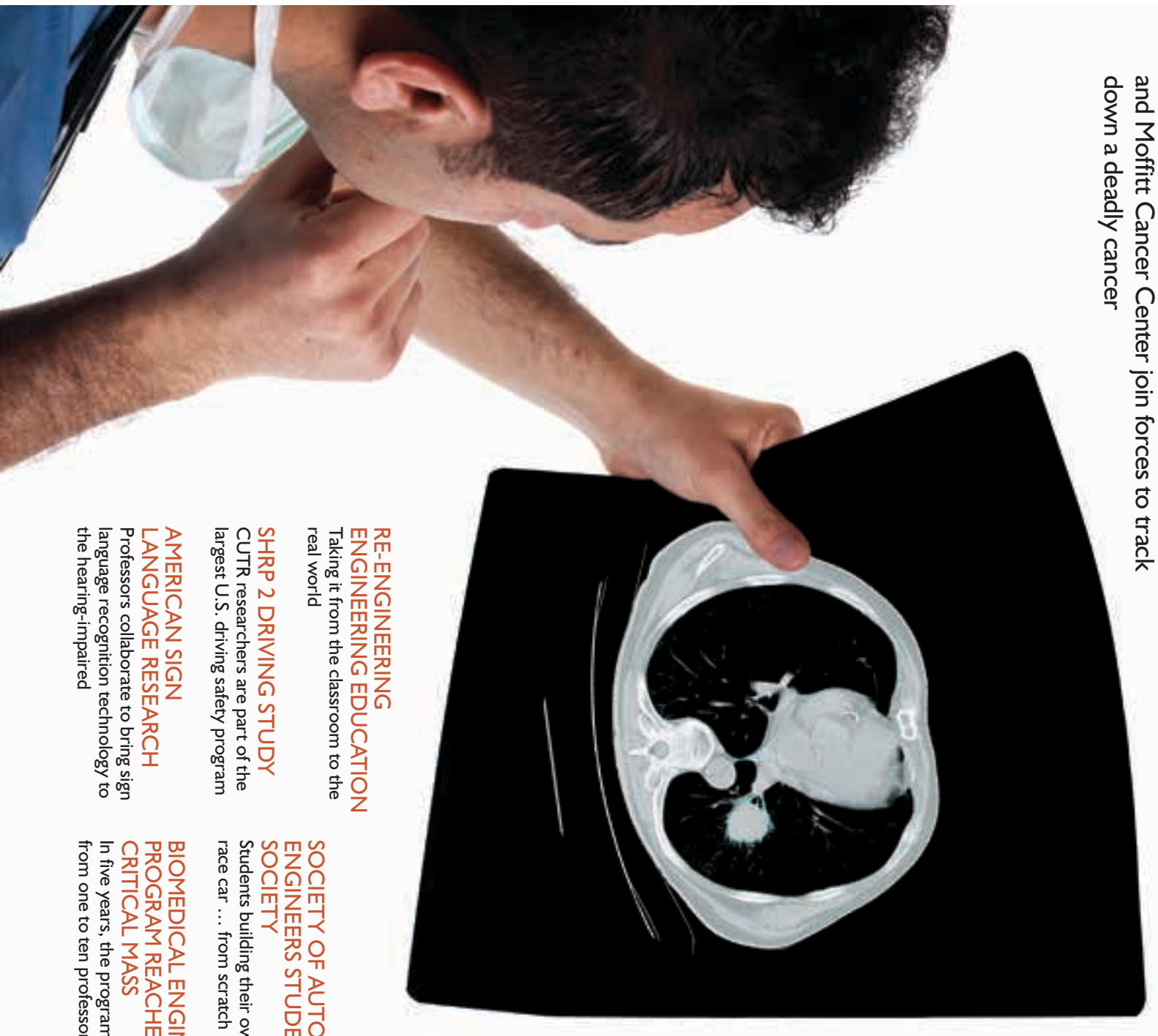
The College recently received a $25.9 million donation from Agilent Technologies, Inc. Every Electrical Engineering student will graduate with experience using Agilent's EEsof EDA software which according to Dean Wiencek "strengthens the value of their degree." USF alumnus and Agilent Account Manager, **Craig Sapashe, '85**, was instrumental in working with us on this historic gift. Agilent's gift is the latest in a series of gifts exceeding $60 million to support the College, and Wireless and Microwave Information Center (WAMI). We are grateful to Craig and the team at Agilent. Thank You!

This summer was busy in the College and the dust has finally settled in the hallways of Engineering II. The Hall of Flags aka "the Fishbowl" has received a face lift, we have a new 80-seat theatre style classroom, a new conference/presentation room and construction is being completed on a new 3,750 square foot collaborative lab. These spaces are fresh, appealing and proclaim that the College is indeed on the leading edge. **The Engineering Alumni Society** under the leadership of Chair **Sheila Carpenter-van Dijk, '96**, has graciously demonstrated their commitment to the College with their generous pledge to name the conference\presentation room. We are indebted to all of you who are part of this commitment or other financial commitments to this project directly impacting our students. For more information or to support the project, please visit: www.eng.usf.edu/renovation

A special word of gratitude goes to our many alumni that pitch in and help advocate for the College throughout the year. Under the direction of **Paul Stevenson, '95**, our Corporate Ambassador Program is thriving. We also thank **Henri Jean, '90** and the fine folks at Tierra for sponsoring the USF CoE Reception at the FES Conference in Miami. Henri went all out to ensure that USF was represented well and that we had the best reception. Thanks Henri and Paul!

We recently celebrated the 18th annual Heart of Gold luncheon for donors and their student scholarship recipients. We were privileged to award 129 scholarships valued in excess of $200,000.00. We were also honored to welcome six new donors into the Heart of Gold scholarship family. Among those was **Dr. Vasant Surti**, P.E. Dr. Surti recently made a significant estate commitment to create a Faculty Fellowship and an endowed scholarship for undergraduate students in Civil Engineering. For his commitment, the commitment of the other new members of the Heart of Gold family and to all of our donors to scholarships and other initiatives of the College know that we are grateful and appreciative for your support.

Speaking of family members, we welcomed a new addition to the College of Engineering Development Office recently. **Beth Creed Fontes** joined us as our new Associate Director of Development. Beth is a Florida native and has lived in Tampa for more than 20 years. Beth is a member of the Board of the Suncoast Chapter of the Association of Fundraising Professionals and most recently worked for the American Cancer Society. Beth is familiar with the profession as her father was an Engineer. Welcome aboard Beth!



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enVision
MAGAZINE

THE FACE OF A KILLER
Researchers from Computer Science & Engineering and Moffitt Cancer Center join forces to track down a deadly cancer

RE-ENGINEERING ENGINEERING EDUCATION
Taking it from the classroom to the real world

SHRP 2 DRIVING STUDY
CUTR researchers are part of the largest U.S. driving safety program

AMERICAN SIGN LANGUAGE RESEARCH
Professors collaborate to bring sign language recognition technology to the hearing-impaired

SOCIETY OF AUTOMOTIVE ENGINEERS STUDENT SOCIETY
Students building their own formula race car … from scratch

BIOMEDICAL ENGINEERING PROGRAM REACHES CRITICAL MASS
In five years, the program has grown from one to ten professors