

# arizonaengineer

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College of Engineering/Pete Brown

**Wild Rovers**—ECE Professor Wolfgang Fink (center) holds Tucson Explorer I. He is surrounded by planetary rovers and students, from left, Chad Essig, Patricia White, Oscar Galvan, and Chris Warner.

## ECE Celebrates 100 Years

The Department of Electrical and Computer Engineering is 100 years old in 2010 and to celebrate its first century ECE organized an exciting program of events to highlight how engineering affects every aspect of our lives.

Celebratory events included a gala evening to raise funds for student scholarships, a public lecture series, a book launch, and an exhibition on the UA Mall of planetary exploration rovers designed by professor Wolfgang Fink, who holds the Keonjian endowed chair and directs the Visual and Autonomous Exploration Systems Research Laboratory.



Fink has received the NASA Board Award and *R&D Magazine's* 100 Award and Editors' Choice award, and his research on autonomous planetary exploration by satellites, airships, and land and sea rovers has been featured in *Science* magazine. Fink and his students demonstrated the rovers in front of the administration building.

CONTINUED ON PAGE 12

# It Takes a Community to Develop an Engineer

Giving the best students the best education requires the best team

We had a wonderful and hectic homecoming weekend. Our annual breakfast was a big success and we welcomed 450 alumni and guests back to campus. The football team crushed University of Washington and the highlight of the weekend was the ECE centennial celebration. I think that we showed the university that we

understand success and that we can throw a great party!

This fall we welcomed our strongest freshman class to the college, and we had our best first-year retention statistics from the class of fall 2009. We also had a strong year in research expenditures and passed the \$25 million mark. We succeeded in these three key areas thanks to our outstanding faculty, hardworking staff, and diligent students

It takes a community to develop an engineer. We recruit with the help of a dedicated staff, a team of 50-plus student ambassadors, and a network of high school teachers, counselors, and parents. Our academic affairs team guides students through our processes, and facilitates tutoring and study programs. Our students welcome freshmen and sophomores into our project teams and professional society groups. Our faculty work hard to lay the foundation for success in the junior year. Finally, we partner with other departments in the university to help students achieve success. If we are going to bring in the best

students, we have to give them the best education possible.

A high level of funding is necessary to do world-class research and to educate graduate students, so we have hired business development and proposal-writing staff to help faculty with grantsmanship. This year we have had much success in recruiting and retaining faculty. We received a great deal of financial help from the university for these new hires and were given special funds to retain strong faculty.

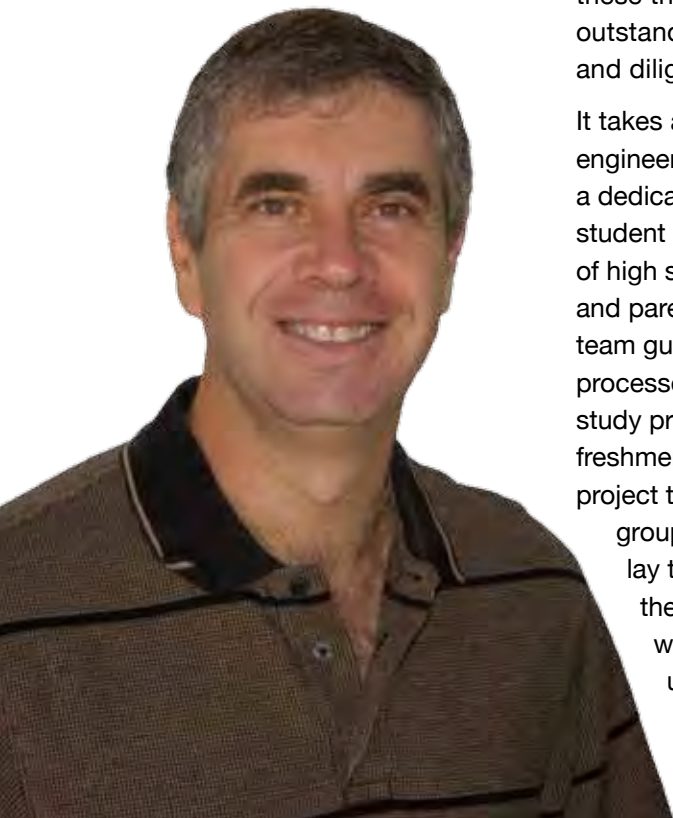
I would like to welcome Barry Benson to the college to lead our development team. Gifts and donations are critical for strengthening our academic and research programs. Barry has extensive fundraising experience and has been active in learning about the college and meeting faculty, students, and alumni.

Wishing you all a great Thanksgiving and holiday season!

Go Cats!



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Many stories in this print edition have been edited for length, and it is not feasible to include related multimedia material such as video and audio files, and hyperlinks to related websites.

 To get the full story, look for the story number by the **Ae** icon embedded in the article, then go to the online edition and enter the story number in the search box.



College of Engineering/ARC Club

**Flying Aces**—ARC team members display their medals and award-winning robotic plane at the SparkFun competition. Left to right are Josh Alexander, Ed Baker, Chris Poole, Josh Tolliver, Cory Pearman, and John Harper.

# UA Aerial Robotics Club Wins Engineering Award at Competition

The UA Aerial Robotics Club won the Engineers Choice Award at a recent national competition.

The ARC was competing in the second annual SparkFun Autonomous Vehicle Competition organized April 17 by SparkFun Electronics at its headquarters in Boulder, Colo.

The award was made by the organizers in recognition of the high standard of engineering evident in the design of ARC's autonomous aircraft.

The team's Twinstar plane completed three completely autonomous aerial circuits of the SparkFun building. Autonomous means that the robotic aircraft navigated under its own control with no human interaction. It could not receive any commands via any medium

from a human operator and was not allowed to transmit information.

The UA team was the first of only two teams to autonomously take off, fly the course and land autonomously in a target landing zone; the team also flew the course at a lower altitude than the other teams, which earned them a low-altitude bonus.

The SparkFun website reported that "the University of Arizona robotics team nailed an amazing autonomous landing, coming to rest right on top of the finish line."

"We're really pleased with the award," said Cory Pearman, ARC team member and mechanical engineering senior. "We placed third overall in terms of speed, but we had the best engineered vehicle, and that's more important."




College of Engineering/Pete Brown

**Flash with a Pan**—MGE student Sarah Dahlin hones her gold-panning skills.

## MGE Down Under

Mining engineering students competed in the 32nd International Mining Games in Kalgoorlie, Western Australia.

More than 40 teams from mining schools in the U.S., U.K. and Australia

 took part in the games, which featured old-fashioned mining techniques such as hand mucking and timber sawing.

Australian teams dominated the event, but UA offered stout competition, placing fifth in the co-ed team class and 14th overall.

The games aim to keep old-school mining techniques alive while forging bonds between mining students around the world. The first games took place in 1979 at the University of Idaho. UA won the 1979 games, and hosted the games in 2007.

The games sound like fun, but the competition has a very serious point: mine safety. It was established in remembrance of miners who died in the 1972 Sunshine mine disaster, and to honor all miners who have died on this very dangerous job.

# Red-Letter Year for EWB

The UA student chapter of Engineers Without Borders was named a “premier chapter” at the EWB annual conference.

Student projects include a water supply and purification project in Mafi-Zongo in Ghana that supplies safe drinking water to more than 10,000 people.

Another project is under way in Mandoli in Mali, where the UA chapter is designing and building a rainwater catchment system to provide people and crops with water throughout the year.

The UA chapter was also invited to speak at the EWB annual conference

about the great strides it has made in growing the chapter.

“We were invited to speak about membership, professional support, funding,” said Terra Michaels, who stepped down this year as chapter president. “Basically, about keeping it all together. The success of Ghana project was also a big factor in us becoming a premier chapter.”

- EWB-UA president and civil engineering senior

**Ae FULL STORY** Number 204 Lauren Case was the only student in the country invited to speak at the Henry C. Turner Prize ceremony, in Washington, D.C., which honored EWB's work.



## EWB Photography Award

The UA chapter won a photography contest at the EWB conference with the above photo of the Ghana project. “The photo was taken outside Mafi-Zongo in the Volta region of Ghana,” said former EWB-UA president Terra Michaels. “The men in the photo are from nearby communities and they are installing a pipeline that leads to a holding tank. Water is gravity fed through the filtration system we designed and built with the community, pumped to this holding tank, then distributed to 30 villages, which is more than 10,000 people.”

## EWB-UA Mali Project

EWB-UA went to West Africa this summer to work on a project to provide clean water to the people of Mandoli in Mali. EWB-UA president Lauren Case and EWB-UA Mali project manager Patrick Mette, both civil engineering seniors, teamed up with

four members and an adviser from the EWB chapter at the University of California at Santa Barbara. Mette said he was excited that the group will be working on the Mandoli pumping system, which hasn't worked for some time. “Our priority is to fix the village pump,” Mette said. “It will address their needs for water quantity, quality, and accessibility.”

## College of Engineering da Vinci Scholars Benefit from \$100,000 Gift

At the same time three new da Vinci scholars were announced, Tucson-based nonprofit Community Finance Corporation awarded the college \$100,000 over 4 years to fund the da Vinci scholarship program.

The da Vinci Circle is the College of Engineering's donor society. Its patrons support faculty and students

with gifts and contributions, and by funding fellowships and scholarships.

This year's da Vinci scholars are civil engineering senior Lauren Case, materials science and engineering and optical sciences senior Alexander Miles, and engineering management senior Becky Witte. Each scholar receives a scholarship of \$2,500.



Becky Witte

Alex Miles

Lauren Case



Courtesy of Omid Mahdavi

**Suits You, Sir**—Omid Mahdavi, in the blue bunny suit at left, shows a tour group around the Micro/Nano Fabrication Center.

## Work With Local Firms Brings Revenue and Reputation for Micro/Nano Lab

Tiny high-tech devices are big news for local industry at the University of Arizona Micro/Nano Fabrication Center.

The center provides commercial clients with prototyping services, clean room facilities and semiconductor chip fabrication equipment to develop new products, said Omid Mahdavi, facility supervisor.

Tucson-based Tempronics Inc., which recently raised \$2.7 million in venture capital, used the Micro/Nano Fabrication



Center to prototype and test new devices designed to convert waste heat into electricity, said Tarek Makansi, Tempronics CEO.

“When materials are made with features at nanometer dimensions, their physical properties change, and these new properties can be exploited for better performing products,” Makansi said. “In our case, we are using nanometer properties of materials to make efficient thermoelectric devices for cooling and conversion of heat to electricity.”

For example, up to 75 percent of the energy produced by internal combustion engines is wasted as heat. By converting waste heat into electricity, Tempronics’ devices could double the mileage of hybrid electric cars, or provide additional power to automotive electrical systems in conventional vehicles.

The firm’s thermo-tunneling effect technology devices use two stacks of proprietary thin films separated by a tiny nano-gap. One side of the device is hot and the other side is cold, with the hot side converting heat into electrons that cross the gap to the cooler side, Mahdavi said.

Revenue from the Micro/Nano Fabrication Center’s clients totals approximately \$130,000 per year, which covers about half of the center’s salaries and operational costs, he said.



College of Engineering/Pete Brown

**Robot Masters**—Graduate student J.J. Proczka, left, and Mountain View High School teacher Robert Kennerly get to grips with a Lego robot they will use to teach engineering principles to students enrolled in ENGR 102 HS at Mountain View High School.

## Teachers Take ENGR 102 to High School

Sixteen teachers from 17 high schools in Tucson, Phoenix and Yuma attended a 2-week Engineering 102 workshop in July at the Tucson Omni National Resort.

The objective was to prepare teachers for the Engineering 102 High School curriculum. The program is only in its third year and already includes 17 schools.

Advisors and college faculty were on hand while teachers attended practical sessions on building solar ovens, Lego robots, and model canoes and catapults, as well as



theoretical sessions on engineering design and systems engineering. Teachers then

returned to the classroom to pass on their knowledge to students who want to earn credit hours toward an engineering degree.

The Tucson Unified School District, in partnership with the UA College of Engineering, won a two-year grant in 2009 from Science Foundation Arizona to implement a program aimed at boosting the number of engineering graduates.

The class carries UA credit and has three main goals: To introduce engineering to math- and science-savvy students who may not have considered it as a career; to give students who really want to be engineers a head start on college; and to help students find out if an engineering career is for them.

## New Error Correction Code Designed in ECE

One company has already licensed the technology and patents are pending to meet growing computer industry demand for the new error-correction algorithm developed by ECE's Bane Vasić.

Error-correcting codes have played a vital role during the last 50 years by ensuring that digital data keeps its integrity within computer communication and storage systems. The error-correction codes programmed into computer chips act just like our brains when we try to make sense of something unfamiliar. Like human brains, these chips search for true meanings by constantly looking for errors and correcting them.

"The error correction-codes that we as engineers build in communications or memory chips are a kind of grammar that computers use to understand data and keep it meaningful," Vasić said.

Now, more than 50 years after discovery of error-correction codes, Vasić has discovered a way to design error-correction decoders with superior performance.

"I am lucky to have extremely talented students and collaborators," Vasić said.

Vasić said his discovery "opens up a plethora of beautiful theoretical problems." The National Science Foundation agrees, and is funding his research to the tune of \$675,000.



Bane Vasić



## New APS Chair Mends Business and Engineering

When professor Anthony Muscat talks with former PhD students about their experiences in industry, a common pattern emerges: Their work involves working on teams that resemble startup companies.

Unfortunately, like so many PhD students who graduate from the nation's engineering schools, they're often not prepared to participate equally with their teammates on nontechnical issues.

As engineers they have outstanding technical skills but often little knowledge of finance, marketing, environmental law, ethics, intellectual property issues and other concepts relating to business or law, says Muscat, a professor of chemical engineering at the University of Arizona who is the first faculty member named to the APS Distinguished Professorship in Technology and Entrepreneurship by the UA College of Engineering.



**"We have to find some balance and some agreement among our faculty."**

Part of the problem is that the engineering doctoral curriculum is designed to produce the next generation of university professors, but only a few follow that career path. Most work in the private sector.

"So I started thinking about how we could change the way we educate master's and PhD students who won't become faculty members," Muscat said.



College of Engineering/Matt Brailey

**Taking Care of Business**—Anthony Muscat in the SRC/SEMATECH Engineering Research Center for Environmentally Benign Semiconductor Manufacturing.

"Once I started thinking on that road, it was natural to make connections with those who teach business and business law on campus."

Muscat has been working with the McGuire Center for Entrepreneurship and UA's Engineering Management program to design a PhD curriculum that gives students business skills and more applications-oriented technical abilities during their first two years as doctoral candidates.

Muscat emphasized that the new curriculum is not designed to replace the PhD experience, in which a student works closely with faculty mentors, delving deeply into a subject and pushing the boundaries of knowledge. But some changes will have to be made.

"The tradeoff is that we have to sacrifice some of the more highly theoretical material," Muscat said. "And that's where we have to find some balance and some agreement among our faculty." Just how this will be done is likely to be different in various engineering disciplines, he said.



College of Engineering/Ed Stiles

**To Boldly Grow**—The prototype lunar greenhouse, an 18-foot-long hydroponic chamber with water-cooled sodium vapor lamps, stands behind some of the research team, from left: Phil Sadler, president of Sadler Machine Co., Professor Gene Giacomelli of agricultural and biosystems engineering, and ABE master's student Lane Patterson.

## UA Engineers Build Lunar Vegetable Garden

The first extraterrestrials to inhabit the moon probably won't be little green men, but they could be little green plants.

Researchers at the University of Arizona Controlled Environment Agriculture Center, known as CEAC, are demonstrating that plants from Earth could be grown hydroponically (without soil) on the moon or Mars, setting the table for astronauts who would find potatoes, peanuts, tomatoes, peppers and other vegetables awaiting their arrival.

The research team has built a prototype lunar greenhouse in the CEAC Extreme Climate Lab at UA's Campus Agricultural Center. It represents the last 18 feet of one of several tubular structures that would be part of a proposed lunar base. The tubes would be buried beneath the moon's surface to protect the plants and astronauts from

deadly solar flares, micrometeorites and cosmic rays.

The membrane-covered module can be collapsed to a four-foot-wide disk for interplanetary travel. It contains water-cooled sodium vapor lamps and long envelopes that would be loaded with seeds, ready to sprout hydroponically.

"We can deploy the module and have the water flowing to the lamps in just ten minutes," said Phil Sadler, president of Sadler Machine Co., which designed and built the lunar greenhouse. "About 30 days later, you have vegetables."

Standing beside the growth chamber, which was overflowing with greenery despite the windowless CEAC lab, principal investigator Gene Giacomelli said, "You can think of this as a robotic mechanism that is providing food, oxygen and fresh drinking water."

## Get an Engineering Degree Without Going to College

Ray Yost earned a doctorate from the UA while working full time for Rio Tinto Minerals. In the process, he wrote a thesis that saved the company's boron operations tens of millions of dollars.

All this happened while he was living in California. He set foot on the Arizona campus only a handful of times during the three years needed to earn his geological engineering degree. Everything else was done through the College of Engineering distance learning program.



"I had talked about returning to school as an on-campus student for a while," said Yost, who earned his master's degree on the UA campus in the late 1990s. "But that just wasn't going to work with my family obligations, career and financial situation."

The MGE department began offering master's and doctoral degrees remotely, and Yost saw his chance to fulfill his PhD dreams while pursuing his career. The result was a winning situation for himself, his company and UA. "The UA increases enrollment, the student gets a high-quality education, and the company gets the financial benefit of the PhD research project," he said.

The SIE department and the engineering management program also offer distance degrees, and electrical engineering and civil engineering offer some courses, said R. D. Eckhoff, director of the engineering professional development program, which coordinates the distance learning programs and also provides support for academic conferences.

# One for the Ages

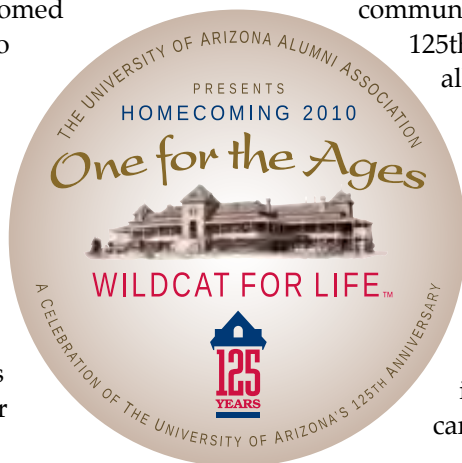
In celebration of UA's quasiquicentennial, aka 125th anniversary, this year's homecoming theme was One for the Ages, and the UA College of Engineering pulled out all the stops with multiple events and a college showcase.

The 47th annual engineers breakfast kicked off the homecoming weekend Oct. 22 with bacon and eggs, while Engineering Student Council President Amanda Davis welcomed the breakfasters, who were then regaled with remarks from College of Engineering Dean Jeff Goldberg and UA President Robert Shelton.

The guest speaker was college alumnus John W. Somerhalder II (BS/ChE 1977), chairman, president and CEO of AGL Resources, an energy services company serving 2.3 million customers in six states.

For Homecoming 2010 the UA Alumni Association inaugurated a collegiate and campus showcase dedicated to UA alumni, friends, and the Tucson community, in honor of UA's 125th anniversary and all those who came before to help make the UA what it is today. The showcase encompassed more than 30 UA campus presentations and tours by colleges, departments, institutions, and campus programs.

The College of Engineering's contributions included "Arizona's Bucket List," a talk by Wendell Ela, professor of chemical and



environmental engineering, on Arizona's impending water crisis. Water was also the theme of a showcase lecture by Shane Snyder, professor of chemical and environmental engineering and co-director of the Arizona Laboratory for Emerging Contaminants. Snyder's talk focused on the "drugs and gender benders" present in our drinking water.

Marty Pagel, associate professor of biomedical engineering, gave a talk on molecular-level diagnostic imaging.



**Go Catheads!**—Jeff Goldberg, Dean of the College of Engineering, right, presents Raytheon campus manager Brian Perry with the much coveted foam Wildcat head, the prize awarded for bringing the greatest number of alumni to the Engineers Breakfast. Sadly, Perry declined to wear the foam head for the camera.



Engineering Student Council President Amanda Davis opened and closed the breakfast program.





College of Engineering/Pete Brown

**Prominence Prize**—Devon Campbell, left, was the inaugural recipient of the Young Professional Achievement Award, which recognizes a single alumnus across all UA colleges who has attained prominence in their field. He is pictured with his mentor, Andrew Ghusson, vice president of development at Ventana Medical Systems.

## Homecoming Honors

The UA Alumni Association and the College of Engineering honored three alumni at the Engineers Breakfast.

### Young Professional Achievement Award

**Devon Campbell (BS/ME 1997, MS/ME 1999)**

Director, Development at Ventana Medical Systems

### Bear Down Award

**Justin Williams (BS/SIE 2000, MBA 2003)**

Director of the Tucson Regional Office of the Arizona Technology Council

### Alumnus of the Year Award

**Douglas Silver (MS/Economic Geology 1980)**

Chairman and CEO of International Royalty Corp



## Towering Achievement

The Civil Engineering and Engineering Mechanics lecture was given by Lawrence Novak (above), senior project engineer responsible for the structural design of the Burj Khalifa tower in Dubai (left). At 828 meters, or 2,717 feet, or 0.51 miles, it is the world's tallest structure.

Much of Novak's lecture focused on wind engineering associated with the Burj. "No one had gone that tall," he said. "We didn't even know the winds up that high, and if you don't know the winds, you don't know your forces."

Part of the fun about this project, said Novak, was that no one knew the final height. "We kept it a secret," he said. "When we released the height on opening day, it was none of the numbers you could find on the Internet."

The same day Novak gave his lecture, Skyscrapernews.com announced that work was progressing on Kingdom Tower in Jeddah, Saudi Arabia. No one knows yet how high this tower will go, but it has been dubbed the "mile-high" tower.

"There's always talk of the next tallest," said Novak. "And in the process of doing Burj, we learned that we could probably go taller."

The Council on Tall Buildings and Urban Habitat determines which is the world's tallest. "They predict that Burj will hold the title for the next 20 years," said Novak.

# UA Bioengineer Awarded \$1.5M by NIH to Study Regeneration of Tissue Damaged by Disease

The National Institutes of Health announced that Pak Kin Wong, UA professor of aerospace and mechanical engineering and BIO5 member, has won a \$1.5 million NIH Director's New Innovator Award. This is the first time the award has been made to a researcher in any Arizona university.

Wong's research aims to discover the rules that govern how biological tissues are formed from individual cells. In particular, Wong is investigating how to grow new tissue to replace that destroyed by disease.

"The research holds great promise in treating degenerative diseases by stimulating damaged tissues to repair themselves, or replacing them with engineered tissues when the body cannot heal itself," Wong said.

Wong's research is seeking the answer to a crucial question in tissue regeneration:

**"We aim to study, understand, and control how nature builds complex tissue."**

How do the cells of a tissue know how to organize into structures that are much bigger than themselves?

"This project will investigate the fundamental rules of cells that collectively drive complex tissue architectures," Wong said.

He will research how individual cells know what they are supposed to do without a central coordinator or a blueprint. "We aim to study, understand, and control how nature builds complex tissue," he said.

"While we have the technologies to study nature at the molecular level, conversely, nature provides an excellent model to

develop even better nanotechnologies," Wong says on his lab's website. Wong's lab develops tools and approaches to understand complex biological systems.

He is also researching how to control and mimic what he calls the "fantastic designs" found in cells and tissues.

He describes this field of study as "systematic bioengineering technologies" and says it has "great potential in revolutionizing medical science and the concept of nanotechnology we think of today."

UA Engineering Dean Jeff Goldberg described Wong as "an outstanding faculty member whose research spans mechanical engineering, medicine and biology."



**Pak Kin Wong**

## NSF Awards \$2.7 Million to Teach High Schoolers About Water and Energy in Arid Areas

Professor Kim Ogden of the department of chemical and environmental

engineering has been awarded \$2.7 million by the National Science Foundation for a project that gets engineering graduates and educators teaching side by side in school classrooms.

The award was made under the NSF Graduate STEM Fellows in K-12 Education, or GK-12, program. STEM stands for science, technology, engineering, and mathematics.

The program aims to give graduate students, or fellows, a greater understanding of their own work, and



**Kim Ogden**

to improve their teaching abilities while sparking kids' interest in engineering. "The idea is for graduate students to invigorate the junior high and

high school curricula by bringing their research related to water and energy engineered systems directly to the classroom," Ogden said.

In addition, schoolteachers will gain professional development through exposure to engineering research and different teaching approaches, and the

UA will be able to exhibit its research to local communities while attracting a new generation of engineering students.

"There's a strong relationship between energy and water," Odgen said.

"Especially in the desert. You have to use recycled or waste water to efficiently produce energy and have a lower overall impact on the environment. On the flip side, you have to find more energy-efficient methods to move water from place to place."

Ogden's team has recruited nine fellows, who will be paid \$30,000 a year plus tuition, from throughout the UA College of Engineering.



Courtesy of David Scott Allen

**Naturally Brilliant**—The new laser facility will enable researchers to shed some light on the processes that produce nature’s vivid colors; processes that could lead to advances in medical imaging and solar energy.

## NSF Awards \$500k for Laser Facility That Will Benefit UA Researchers Across Campus

Have you ever wondered why, or rather how, flowers have such bright colors? Some fairly complex physics and chemistry lie behind the vibrant reds, yellows, blues and greens that shine when sunlight meets leaf or flower.

Sunlight includes all the colors of the visible light spectrum, plus some invisible ones such as ultraviolet and infrared.

**Ae FULL STORY** Number 182 Desert lavender, for instance, is blue because pigments in its flowers absorb yellow light and reflect other colors, which appear blue in combination.

But what, exactly, happens in that minuscule fraction of a second after a photon of sunlight strikes an atom in a plant pigment? In fact, what happens when a photon of light hits any atom in any substance, including the human body?

Marek Romanowski, associate professor in the biomedical engineering department, believes that understanding the behavior of light during this femtosecond moment will, among other things, improve the early detection and treatment of disease, particularly cancer.

Romanowski, who is also a BIO5 member, heads a UA research team that recently won an NSF award of \$506,800 to help fund a multiuser femtosecond laser facility. The UA is providing a further \$217,200. The system is described as “broadly tunable,” meaning it is capable of producing any wavelength, or color, in the visible and near infrared spectrum. It is expected to lead to new research directions in photochemistry, spectroscopy, and imaging.



Courtesy of Armin Sorooshian

**Air Time**—Armin Sorooshian monitors atmospheric analytical equipment aboard a Navy Twin Otter plane.

## Navy Awards Chemical Engineer \$500k Under Young Investigator Program

The Office of Naval Research is funding the development of analytical equipment that will enhance Navy operations while advancing our knowledge of how aerosol particles affect the atmosphere.

Assistant professor Armin Sorooshian of the department of chemical and environmental engineering has been named one of the select few to receive more than \$500,000 research funding from the Office of Naval Research.

The ONR recently named 17 recipients as winners of its 2010 Young Investigator Program, which invests

**Ae FULL STORY** Number 144 in scientists and engineers who show exceptional promise. Award recipients were selected from 211 proposal submissions. The winners will receive a three-year research grant of up to \$510,000.

Sorooshian studies aerosol particles and how they interact with water and radiation in the atmosphere. These tiny atmospheric particles also interact with light and reduce visibility. Because aerosols are the seeds of cloud droplets, he is especially interested in how marine aerosols affect clouds. He uses a range of methods and tools to study aerosols, such as satellite remote sensors, models, and aircraft measurements. “These aerosols, which influence critical environmental parameters such as visibility, remain poorly understood owing to their complex nature, measurement limitations, and the difficulty in untangling aerosol effects from meteorology,” Sorooshian said.

## Hispanic Engineering Group Names Corral 'Most Promising' Engineer

Erica Corral, assistant professor in the department of materials science and engineering, has been named most promising doctoral engineer or scientist by the Hispanic Engineer National Achievement Awards Conference, or HENAAC.

The conference is an annual event that recognizes the achievements of Hispanics in science, technology, engineering and math, which are known collectively as the STEM subjects. HENAAC, now in its 22nd year, is organized by Great Minds in STEM, a nonprofit that promotes careers and cultivates Hispanic talent in STEM subjects.

HENAAC awards are considered a great honor in the Hispanic community because they are made by the only national organization committed to highlighting and showcasing the brightest and most talented Hispanic professionals in STEM fields. A selection committee drawn from industry, academia and government judges award winners, which HENAAC says "must be truly stellar in their field."

Corral described the award as "very meaningful" because it acknowledged her academic and scholarly achievements



College of Engineering/Pete Brown

**Most Promising**—Erica Corral, second from left, in the Arizona Materials Lab with some of her students.

in materials science and recognized her potential impact in the field. "My HENAAC award is also a reflection of the commitment that the University of Arizona has shown to me since my arrival in August 2008," Corral said.

## ECE Celebrates 100 Years

CONTINUED FROM PAGE 1

UA President Robert Shelton said of the ECE centennial: "All of modern life is shaped by the circuits, signals and microsystems that form the core work of the UA's dynamic department of electrical and computer engineering." Shelton also lauded the department's past and potential future: "This department has brought distinction to the UA since 1910 and will lead the way in its next century with horizons stretching from astronomy, optics, neuroscience and medicine to theater arts and entertainment," he said.

The first speaker in the centennial lecture series was Saul Griffith, inventor, entrepreneur and MacArthur "Genius Grant" fellow, who spoke about the energy needs of the planet.



The second speaker was Paul Kelm, head of automation for "O," Cirque du Soleil's resident show at the Bellagio in Las Vegas. Students who complete the Advanced Motion Control course in ECE are often snapped up by Cirque du Soleil and similar production companies because of their unique engineering knowledge in the field of theatre arts, which was the focus of Kelm's lecture.

The final speaker of the series was ECE alumnus Ray Oglethorpe, former

president of AOL, who gave a forward-looking talk titled "ECE's Second Century: The More Things Change..."

ECE also published a book covering the history of the department in a collage of little known facts, curious stories, and major historical achievements.

Jerzy W. Rozenblit, University Distinguished Professor and ECE department head, expressed his pride his department's history. "As we celebrate our centennial, the electrical and computer engineering department will showcase its rich history and outstanding contributions to the profession and community," Rozenblit said. "We are known for our signature research, our spirit of innovation and discovery, our national and regional outreach, and the superb career accomplishments of our graduates."

# Double Accolades for ChEE

Professor Eduardo Sáez and his department both got ceremonial salutes at the Accolades awards April 22.

Accolades is an annual event sponsored by the Center for Student Involvement & Leadership at the University of Arizona to recognize outstanding leadership by students, organizations, departments and programs.

Sáez received the Outstanding Faculty award for his commitment to the students he advises while teaching and inspiring them to succeed.

Sáez is a member of the department of chemical and environmental engineering, which itself received the Department of the Year award for excellence in serving its students,



Courtesy of Jim Field

**Outstanding**—Professors Eduardo Sáez, left, and Jim Field, head of chemical and environmental engineering.

staff and faculty by providing a place of support; encouraging diversity, creativity and involvement on campus; and promoting excellence in education.

# ECE Professor Goes on Detail at NSF

Professor Ahmed Louri of electrical and computer engineering was recently appointed by the National Science



Ahmed Louri

Foundation as director of its Software and Hardware Foundations, or SHF, program.

The SHF is one of three research programs

supported by the NSF's Division of Computing and Communication Foundations in the Directorate of Computer and Information Science & Engineering. The directorate has awarded almost \$2.3 billion to support research in all areas of computer and information science and engineering.

During his detail at NSF in Washington, D.C., which could last as long as 4 years,

Louri will seek out promising areas of research that merit NSF investment.

He will be responsible for long-range planning and budgeting and will oversee merit reviews for proposals to ensure that investments are made in diverse cutting-edge projects.

Louri's position as director of the UA's High-Performance Computing Architectures and Technologies Lab made him a front-runner for this prestigious appointment.

University Distinguished Professor Jerzy Rozenblit, head of the electrical and computer engineering department, congratulated Louri: "Dr. Louri's appointment at NSF is testament to the international reputation that he, the department and the UA share in this field, and we are proud to be making an impact on the national agenda," Rozenblit said.

# New Development Head

Barry Benson is the college's new senior director of development.



Barry Benson

He joined the college Sept. 7 after a year as director of regional development at the UA Foundation.

Before he came to UA, Benson spent 5 years as director of development at the University of Northern Colorado in Greeley, where he helped set up dozens of new scholarships and presided over a tenfold increase in college donations.

Benson is no stranger to many engineering alumni, and hopes to forge even stronger ties in his new role. "Having traveled the country for the past year visiting with UA alumni and donors from across campus, I can tell you that engineering graduates and those who support the college truly appreciate and value their UA experience," Benson said.

He is a certified financial planner with a background in financial services. Before moving into development he worked for companies such as UBS Wealth Management and JPMorgan Chase. He got his bachelor's degree in finance from the University of Northern Colorado in 1998, and his master's degree in business administration from Colorado State in 2009.





**Jim O'Grady**

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**Jim O'Grady**  
**MS/CE 1973**

Jim O'Grady's master's degree had an emphasis on transportation, and since leaving UA he has worked in local government, first at the city of Arvada in Colorado, where he developed the city's transportation plan and headed the city's first transportation department. In 1984 he became director of public works, then assistant city manager, for the city of La Mesa, Calif. He retired from full-time public service in 2006 when he was assistant city manager and economic development director for the city of Temecula, Calif. He has since done private consulting and work for the cities of Coronado and Santee, both Calif. He is currently interim director of redevelopment and housing for the city of El Cajon, Calif. He is also vice president of the board of directors for the Home of Guiding Hands, a nonprofit group that provides homes and care for people with developmental disabilities. He enjoys golf, hiking, and bicycling. "I just completed a 300-mile bike ride in the Texas hill country," O'Grady said, "which also served as a fundraiser for the Home of Guiding Hands."

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**Philip Golden**  
**BS/EnergyEng 1985**

Phil Golden works in the industrial refrigeration industry, designing the refrigeration systems of large plants and warehouses in the food industry, such as cheese plants, breweries, and meat-packaging facilities. Two years ago he established Golden Industrial Refrigeration, an engineering consulting business. In addition to design work, his contracts include efficiency studies, refrigerant charge calculations, process safety management, and mechanical integrity testing. Most of his work is done on ammonia refrigeration systems, and he advocates the use of natural ammonia as a refrigerant rather than CFCs.



**Philip Golden**

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**Edmund H. Conrow**  
**BS/NE 1971, MS/NE 1974**

Ed Conrow was named a fellow of the International Council on Systems Engineering, the highest grade of membership possible in INCOSE, at its July 2010 international symposium in Chicago. He was selected for "research and practice associated with risk management, and cost, performance, and schedule trade methods." Conrow is an internationally recognized expert who helps clients reduce project risk and uncertainty, and better develop and deliver products within budget, on time, and to performance requirements. He has been a risk manager and mentor to risk managers more than 25 times on various programs, and is the author of books, book chapters, and numerous publications on risk management. Conrow is a certified management consultant, a certified project management professional, an AIAA associate fellow and life member, and an IEEE senior member.



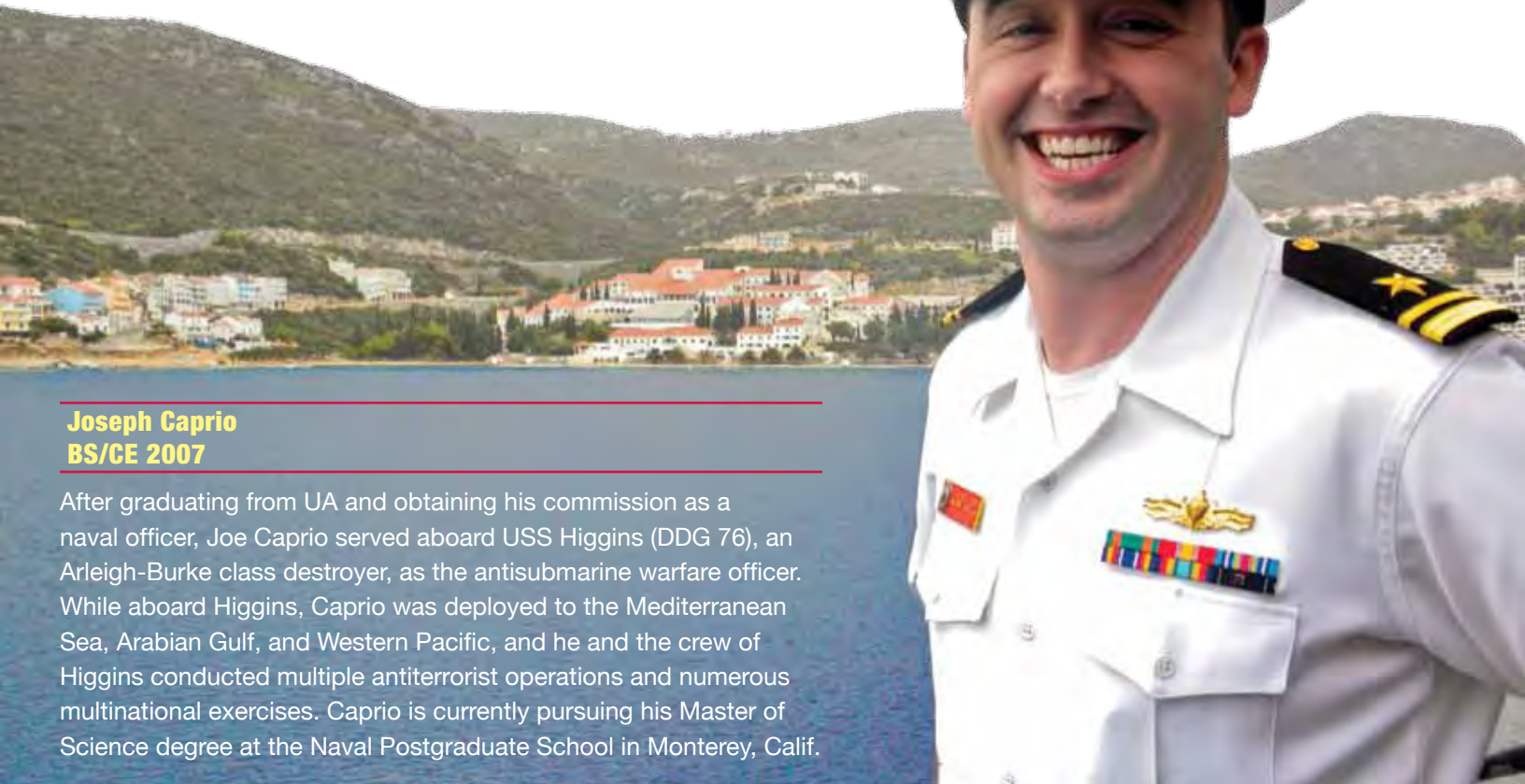
**Pat Branch and son Jared**

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**Pat Branch**  
**BS/AE 1982**

After graduation, Pat Branch went to California to visit another UA alumnus, Jack Doll (BS/AE 1979), who got him a job at McDonnell Douglas Aircraft doing aerodynamics on the C-17. Three years later he moved to Northrop Grumman to work on the B-2 stealth bomber. "That was a great contract to work on for an engineer because cost was not an issue," Branch said. "Making it work and work right was the most important thing." Branch worked on the B-2 for 12 years in flight controls design and test, and then transferred to the Florida division to work on the E-8 Joint Surveillance Target Attack Radar System. When Lockheed won the F-35 Joint Strike Fighter program, he got a job as a systems engineer working flight control requirements and safety analysis. "That job allowed me to work on every system on the aircraft," Branch said. In late 2008, as the engineering was winding down on the F-35, Branch went to work for L-3 Communications on unmanned air vehicles. "UAVs have always been a little passion of mine, so it is nice to continue to enjoy my job," Branch said. "I now get to design all aspects of a number of different sized UAVs, including the ground station and pilot interfaces. If you are ever in the Dallas area and want a tour of our little facility, look me up." Contact Branch at [pat\\_branch@yahoo.com](mailto:pat_branch@yahoo.com).

Joe Caprio on the deck of USS Higgins as it pulls into Neum, Bosnia-Herzegovina, for a foreign relations reception.



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**Joseph Caprio**  
**BS/CE 2007**

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After graduating from UA and obtaining his commission as a naval officer, Joe Caprio served aboard USS Higgins (DDG 76), an Arleigh-Burke class destroyer, as the antisubmarine warfare officer. While aboard Higgins, Caprio was deployed to the Mediterranean Sea, Arabian Gulf, and Western Pacific, and he and the crew of Higgins conducted multiple antiterrorist operations and numerous multinational exercises. Caprio is currently pursuing his Master of Science degree at the Naval Postgraduate School in Monterey, Calif.



**Abdul Aziz Al-Anazi (left) and Cemal Basaran**

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**Cemal Basaran**  
**PhD/CEEM 1994**

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**Abdul Aziz Al-Anazi**  
**PhD/CEEM 1996**

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Cemal Basaran is a full professor at the State University of New York at Buffalo in the department of civil, structural and environmental engineering, and director of the SUNY's Electronic Packaging

Laboratory. He is working with former classmate Abdul Aziz Al-Anazi, founding president of the University of Tabuk system in Saudi Arabia. Basaran is helping Al-Anazi establish the first fully accredited American-style research university in the Middle East, which, when completed, will have 50,000 students. Basaran described it as "a very challenging task; at the same time it is very rewarding."

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**Gary Wonacott**  
**BS/AE 1968**

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After graduating from UA, Gary Wonacott went on to get his master's degree in engineering mechanics from Cal State Long Beach in 1974. "I am getting close to retirement now," Wonacott said, "but I'm fortunate as CEO of my company to be able to structure my time to be of greatest value to the company and myself." He worked for several companies

during his early career: Boeing, Garrett AiResearch, General Atomics, and Pullman Standard; and consulted for Daimler-Benz in Stuttgart in the early 1980s. After returning to the U.S., Wonacott helped start up two employee-owned companies, and finally started his own company, San Diego Composites, in 2003. "We are a composites materials and structures systems company with multiple business interests," Wonacott said, "including both R&D and production." His wife of 34 years, Jeanne, a former teacher in San Diego, is a past president of the Mission Beach Women's Club, a social and philanthropic organization. "She is keeping track of her harp, fish and 6-year-old border collie," Wonacott said. "Not to mention our one-month-old grandchild, Lukas, son of our daughter, Chelsea, and her fiancé, Per, who live in Sweden."



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