

arizonaengineer

Published by the UA College of Engineering • Online at www.engineering.arizona.edu/news

INSIDE THIS EDITION



4 **Winning Women**
All-female team takes national ASEM prize



9 **Building Innovation**
Latest designs revealed for new College building



12 **Suitable for Miners**
MGE celebrates 125 years and many changes



13 **Alumni Echoes**
Where are they and what are they doing?

azengineering



There's Nothing Fishy About Success of Design Day 2013

Photo by Gordon Bates

Tanks for All the Fish—Robotic fish team members pose with their aquatic creation at Design Day 2013, which moved to a new venue this year, the Tucson Marriott University Park. Left to right are Chas Leichner, Hannah Grant, Clayton Stewart, Mohamed Khairy, Yi Chieh Chen, and Robbie Laity.

Engineering Design Day gets bigger and better every year. This year more than 300 engineering seniors presented about 60 sponsored projects, some of which were nearly ready to make their commercial debut in real life.

First-place winner of Best Overall Design, the robotic fish, proved to be a favorite not only among the industry judges but also among big and little kids alike who attended the 11th annual College of Engineering Design Day on April 30, 2013 at the Tucson Marriott University Park.

Visitors to aquariums around the world may soon be using joysticks to guide the robotic fish in underwater environments as they learn about aquatic habitats through the eyes of a fish via high-definition streaming video.

"This year's quality of projects was outstanding," said Robert Laity, who does marketing for the robotic fish's sponsoring company, MediaMation Inc., and who was one of the team's mentors. "This team was incredible. They worked together really well and produced an excellent product."

Second place in Best Overall Design went to the portable thermal optical test chamber for aerospace technologies, sponsored by MIT's Lincoln Laboratories.

CONTINUED ON PAGE 8

New Talent, Old Friends

The funding landscape is shifting rapidly beneath our feet, but thanks to friends old and new we are forging new partnerships to secure our future.

Buildings are important, but it also takes high-quality people to move the College forward. Spring is when we interview new faculty candidates, and this year we have an outstanding group. I am most impressed with the breadth of our

candidates, and many of them would be at home in two or three of our departments. Big engineering problems require ideas from multiple disciplines, so this breadth is critical if we are to make progress. In the fall, we will have as many as 10 new faculty members, and we are expecting another strong freshman class, including three Flinn Foundation Scholars.

Through Tech Launch Arizona, or TLA, the University is making a major push in technology transfer. The College is well positioned, and we have already won six TLA grants to develop technologies for market. Funding for research and development is shifting away from federal sources to public-private partnerships. We know how to be a great partner with industry, and we are ready for that change.

We have made significant progress in extending our educational reach beyond Tucson. We now have online certificate and master's programs in mining

engineering, systems engineering, and engineering management, and we are developing MS programs in construction management and electrical and computer engineering. We are partnering with Intel to offer bachelor's degrees in materials science and engineering and chemical engineering to company employees worldwide. Our ENGR 102 in High School program has now been implemented in 23 schools, which we expect to increase to 27 by the fall.

I would like to personally thank you for your past and future support, because great friends are crucial to our success. Have a great summer, and I hope to see you soon. We are already making plans for Homecoming in November 2013!



Email: jgoldberg@arizona.edu
Telephone: 520.621.6594
Twitter: @UA_ENGR_Jeff_G



arizona engineer

spring 2013 • volume 36 number 1

The University of Arizona
College of Engineering
P.O. Box 210072
Tucson, AZ 85721-0072

editor/designer pete brown
telephone 520.621.3754
email pnb@email.arizona.edu
www.engineering.arizona.edu

Arizona Engineer is published twice a year for alumni and friends of the University of Arizona College of Engineering.

All contents © 2013 Arizona Board of Regents. All rights reserved.

The University of Arizona is an equal opportunity, affirmative action institution. The University prohibits discrimination in its programs and activities on the basis of race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation or gender identity, and is committed to maintaining an environment free from sexual harassment and retaliation.

ARIZONAengineer_online

Arizona Engineer is available online at www.engineering.arizona.edu/news

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.



Photo: UA Engineering

First Class—Biomedical engineering seniors Kaitlyn Ammann and Katrina DeCook are in the first senior class of biomedical engineering students at the University of Arizona. They presented their research at the inaugural UA Biomedical Engineering Design Day. Left to right are Amman, DeCook, UA BME professor Marvin Slepian, and postdoctoral student Phat Tran.

First Senior Biomed Engineering Class Displays Research at BME Design Day

The University of Arizona's first senior class of biomedical engineering students presented their research to fellow students, faculty and industry representatives at the inaugural UA Biomedical Engineering Design Day Oct. 30, 2013.

Among the 20 projects on display was research that centered on ways to more effectively diagnose cancer in its early stages, particularly the ever-evasive ovarian cancer, and a new way for joint-repair patients to monitor their own recovery using a tablet computer.



"This is the first time I get to see all of the other projects happening here in biomedical engineering and the biomedical field," said BME senior Katrina DeCook. "It's good practice, and it gives us good feedback that we can take back to the lab."

Undergraduate enrollment in biomedical engineering has grown significantly over the last four years. This year, the department has more than 150 students, with a predicted 230 students in the program by 2014.

Biomedical engineering junior Sumana Veeravelli was recognized with a first-place award for her project, Magnetic Resonance Imaging of the Neurological Effects of Hypertension, which studies an improved method of measuring the effects of hypertension on the brain. BME undergraduate students Michelle Heusser and Logan Graves won second- and third-place awards, respectively.

BME Design Day was sponsored by W.L. Gore and Associates.



Photo: UA Rube Goldberg Club

Disastrous!—At the 2013 National Rube Goldberg Machine Contest in Columbus, Ohio, the UA Rube Goldberg team, pictured above, was awarded second place in addition to receiving the Legacy Award for having the machine with the best incorporation of humor and engineering creativity. The team also won the Legacy Award at the 2012 competition.

UA Rube Goldberg Machine Is Complete Disaster, and Winner

The new Rube Goldberg machine designed and built by the UA Rube Goldberg Club was a complete disaster. But it was no accident.

To design this year's machine, club members styled themselves as a fictitious global engineering conglomerate called Hindentech. "We make terrible inventions," said Alberto Martin-Adan, club president and engineering sophomore. "Our company motto is 'close enough.'"



This year's machine, which took second place and won the Legacy Award for the machine with the best incorporation of humor and engineering creativity, was more like a series of disasters waiting to happen. It had one simple task to perform: to make a hammer hit a nail. But the long and perilous path to achieving that task involved a nasty lawnmower accident in a kitchen, a space exploration mission that blew up the moon, and a volcano that destroyed an off-road vehicle. And there was a pirate in there somewhere, too.

The club debuted its machine in February 2013 at the Engineers Week Rube Goldberg competition in Crowder Hall on the UA campus. At its first national competition in 2012, at Purdue University in Indiana, the club was awarded the Rube Goldberg Legacy Award for its inventive machine, Wilma Wildcat and the Restless Restroom.

Grad Student Sends Research Into Space

Most graduate students finish up in four or five years. Electrical and computer engineering graduate student Brian Fox has labored the better part of the last seven years.

He saw his optical fibers launched into space aboard space shuttle Atlantis three years ago, then waited 18 long months to see how the radiation-hardened fibers had fared in the harsh space environment on the Materials International Space Station Experiment-7, or MISSE-7.

Finally, in May 2011, the test fibers arrived back aboard space shuttle Endeavour on its final mission, commanded by Capt. Mark Kelly (husband of former Arizona Rep. Gabrielle Giffords).



Brian Fox (left) and Kelly Simmons-Potter

Fox and his mentor, Kelly Simmons-Potter, a professor in the department of electrical and computer engineering and College of Optical Sciences, set out to see how optical fibers doped with the rare earth metals erbium and ytterbium would hold up hundreds of miles above the earth's protective atmosphere.

"MISSE is one of those rare opportunities that only come around once or twice in a lifetime," said Fox. "How many people get to send their research into space?"

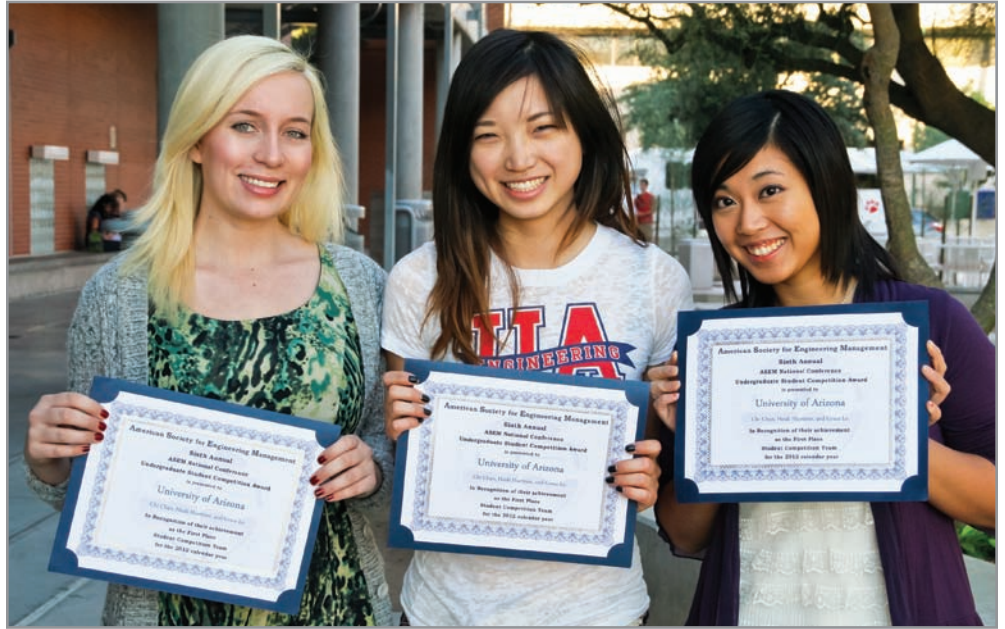


Photo: UA College of Engineering

Creative Approach—The UA engineering management team members who tied for first place in the ASEM 2012 IAC Student Case Study Competition show their winners' certificates. From left are Heidi Huettner, Grace Lo and Chi Chan.

All-Female Team Ties for First Place at National Engineering Management Contest

A team of undergraduate students from the University of Arizona student chapter of the American Society for Engineering Management traveled across country to the annual meeting of industry professionals in Virginia Beach, Va., and captured first place in the national engineering student competition.

The three-person team – engineering management majors Heidi Huettner and Chi Chan, and mechanical engineering junior Grace Lo – tied for first with a four-person team from the U.S. Military Academy at West Point.

"They rigorously prepared in advance for the case study event, because use of materials during the actual competition is extremely limited," said Jennifer Horner, UA systems and industrial engineering project manager and the UA ASEM student chapter advisor. Internet use was not allowed. Teams had to rely on their own engineering skills.

"It really was a true test of what we knew," said senior Heidi Huettner. "I was able to utilize skills learned in the engineering management and systems engineering classes I've taken."

Huettner said that once the teams were given the problem statement (this year it was an analysis of a specific company's management style), they had six hours of uninterrupted work time to solve the problem.

The UA engineering team then added a creative element: Instead of the usual presentation directed at the audience, the team presented its engineering solution as a mock consultation session, with the three team members interacting to solve the problem. The judges liked the creative approach.

"Many people told us afterward that they enjoyed our different approach," Huettner said. "It was the first time I felt involved in the big picture of engineering management."



About 600 Engineering 102 students, faculty members and industry representatives turned out for the College's third Solar Oven Throw Down. "This was the first semester all the students competing in the throw down were on the mall at one time,"

said Engineering 102 co-coordinator Brian Cunningham. "This year was very special, as it was the first time we received sponsorship support," he added. W.L. Gore and Associates sponsored the event, held on the UA Mall. In ENGR 102's solar oven

project, freshman engineering student teams design the best possible solar oven and predict the temperature it will reach. At the Solar Oven Throw Down, they test their ovens to determine the accuracy of their predictions.

Photo: Pete Brown, UA Engineering

Women, Hispanic Students Lift UA Engineering to Record-Setting Freshman Class

The fall 2012 engineering freshman class was the largest since the first engineering freshman walked up the steps of Old Main 120 years ago, and included record numbers of women and Hispanic students.

"We're bringing to the University a high-quality group, a more diverse group, and a larger group of freshman engineering students than ever before," said College Dean Jeff Goldberg. "We're educating them in a way that increases both learning and motivation, and we're helping to meet the engineering needs of Arizona and the nation."

Freshman enrollment increased 20 percent over fall 2011, to 670 students, with women making up 28 percent and minorities representing 36 percent of incoming engineering students. Hispanic students count for 24 percent of the freshman engineering class.



Photo courtesy of Abby Davidson

Wild About UA—Engineering freshman Abby Davidson stands with Wilbur Wildcat. "I am absolutely loving my freshman experience here at the UA," Davidson said.

The average high school grade point average, or GPA, for engineering freshmen is 3.69 out of 4, and the average math and verbal SAT score is 1,243.

The quality of undergraduates entering UA engineering is no accident, said Jim

Baygents, associate dean of academic affairs for the College of Engineering.

"We believe quality comes first, and we recruit and admit accordingly," he said. "As the academic programs offered by our faculty and staff have continued to improve, so too have the students who populate them."

Students new to the program attribute their enthusiasm and success to a supportive and inclusive environment.

"Our community is a tight-knit group of students who are lucky enough to have a great faculty always there to support us," said engineering freshman Abby Davidson, a member of the UA student chapter of the Society of Women Engineers and a resident of the College's Engineering Zone dormitory. "I am absolutely loving my freshman experience here at the UA."



Photo: UA College of Engineering

Water Worlds—The EPA’s Sally Gutierrez shares Ohio’s water cluster model with UA faculty, county and city administrators, and community activists at a presentation on the UA campus.

College Steams Ahead with Water Technology Innovation Cluster

The UA has joined the growing number of U.S. regions that are planning their futures around water-based economies by creating water technology innovation clusters.

Water clusters build networks of universities, governments and businesses that serve as catalysts for economic development while protecting this precious resource.

In the University’s latest show of support for a regional water cluster, the College of Engineering hosted a workshop featuring keynote speaker Sally Gutierrez, the Environmental Protection Agency’s new director of the highly successful cluster “Confluence” in Cincinnati, Ohio.

“There is no doubt in my mind that you have the assets here in Arizona,” said Gutierrez, a former director of the EPA’s National Risk Management Research Laboratory, which employs more than 400 environmental and chemical engineers, chemists, microbiologists, economists, hydrologists, and other staff focused on water. “You have a great infrastructure,” she said. “Many programs already exist at the UA and in the surrounding communities.”

Discussions on establishing a water cluster in the Tucson area are in progress not only with local governments, utilities and corporations, but also with water cluster representatives in Australia, the Middle East and Israel, said Glenn Schrader, associate dean of research and graduate education, whose office organized the workshop with the EPA.



Photo courtesy of Intel

Intel Inside—At an event to cement their relationship and officially launch the online degree programs, Intel and UA Engineering teams show a framed memento to recognize the collaboration.

UA and Intel Join Forces to Deliver Online Engineering Degree Program

Thanks to a new Intel-UA collaboration, Intel employees now have the opportunity to boost their education to help keep Intel the world’s biggest chip manufacturer.

“I’ve always wanted to complete my four-year engineering degree, but kids and a family made it more and more difficult to find the time,” said Mike Dokouzian, a facilities manager at Intel’s Ocotillo site in Chandler, Ariz., and one of the first students to enroll.



to find the time,” said Mike Dokouzian, a facilities manager at Intel’s Ocotillo site in Chandler, Ariz., and one of the first students to enroll.

Intel’s Fab/Sort Manufacturing College of Engineering, the company’s corporate university, and the UA College of Engineering are working together to give Intel employees a distance-learning opportunity to earn bachelor’s degrees in chemical engineering and materials science and engineering.

The online program allows Intel FSM employees the flexibility to further their education while managing their work and life needs. “This program enables me to see a path to finishing my degree,” said Dokouzian, who has been with Intel for 20 years and is pursuing a bachelor’s in materials science and engineering.

Admissions standards for Intel employees enrolling in the online distance-learning degree programs are the same as those for any other student applying to the UA College of Engineering, said Jim Baygents, the College’s associate dean for academic affairs.

“Our college mission includes doing world-class research and providing a world-class education,” Baygents said. “We have developed 32 online courses for Intel personnel who want to pursue accredited bachelor’s degrees in chemical engineering or materials science engineering from the UA.”

ECE's Jonathan Sprinkle Earns NSF Career Award

Jonathan Sprinkle was awarded the National Science Foundation Career, or Early Faculty Development, Award in 2013. The Career Award is the NSF's most prestigious honor for junior faculty members who demonstrate outstanding research, excellent education, and the integration of education and research within the context of the mission of their organizations. Sprinkle's award includes a \$460,000 grant over five years to support his educational activities and cyberphysical systems research.

In highly interconnected and complex ways, cyberphysical systems integrate computers with the real world. They enable us to control things in our home while we are away, invent new kinds of medical monitors and treatments, and expand our air transportation capabilities. They have to be able to communicate in real time and predict how long computations will take. Unfortunately, that's much easier to say than do.

"We know how to build cyberphysical systems, we just do not know how to build them in an efficient, cost-effective way," said Sprinkle, adding, "Almost all large cyberphysical systems projects go over time and over budget."

The goal of Sprinkle's research is to make it easier to build cyberphysical systems by using new kinds of programming



Photo courtesy of Jonathan Sprinkle

Student-Driven Project—Jonathan Sprinkle stands by his robotic car, which will be used as a test bed by his research team, and by high school students, as part of his NSF Career Award.

languages that are based on graphical models. The UA's robotic car will serve as a test bed for the new modeling techniques.

"He is a rising star on the national engineering scene, and his work is at the forefront of thinking about systems that run themselves," said UA Engineering Dean Jeff Goldberg. "This project will help bring to fruition futuristic ideas such as cars that drive themselves, mobile patient monitoring and treatment devices, and border security systems."

Faculty Head to Market with Cost-Limiting Thermostat

Ae FULL STORY
Number 529

A National Science Foundation Innovation Corps award has helped put two ECE faculty members well on their way to market with a product that has the potential to dramatically alter home energy usage. Jonathan Sprinkle, Susan Lysecky and their research team have developed a heating and cooling thermostat that enables homeowners to decide temperatures based on their budgets. The cost-limited thermostat means no surprises when the electricity bill lands in the mailbox.

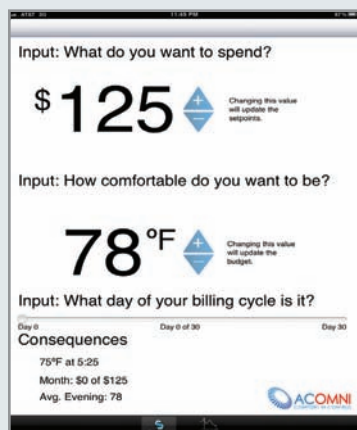


Photo courtesy of Jonathan Sprinkle

Cool App—The project team developed a mobile app, which shows how budget and temperature correlate, to control home heating and cooling.

"Most people just set their thermostat temperature in



Photo courtesy of Acomni

Hot Team—Jonathan Sprinkle (left), Xiao Qin, Susan Lysecky, and Manny Teran formed a startup, Acomni, to market a thermostat that allows consumers to balance heating and cooling costs with comfort.

the desired range then get a bill at the end of the month with no understanding of how they correlate," said Sprinkle.

The cost-limiting thermostat puts consumers in control of balancing their comfort and budget. When the temperature schedule or monthly budget is changed, the thermostat immediately displays how one affects the other.

Nothing Fishy About Success of Design Day 2013

CONTINUED FROM PAGE 1

Like the robotic fish and thermal optical test chamber, many of the yearlong, client-driven Design Day projects are only steps away from the consumer market or from use in industry.

The inexpensive, environmentally sustainable hydroponic barley fodder system, which won the Innovation in Engineering Award and was sponsored by Bosque Engineering LLC, is on its way to helping feed a herd of about 30 alpacas.

A disposable, low-power blood glucose meter, which won a number of awards, including Most Innovative Systems Integration, could one day give people with diabetes another way to track their blood glucose levels via mobile devices.



Photo: Gordon Bates

Wing Commander—AME student Joya Cerutti displays her team's flying wing micro air vehicle at Engineering Design Day 2013.

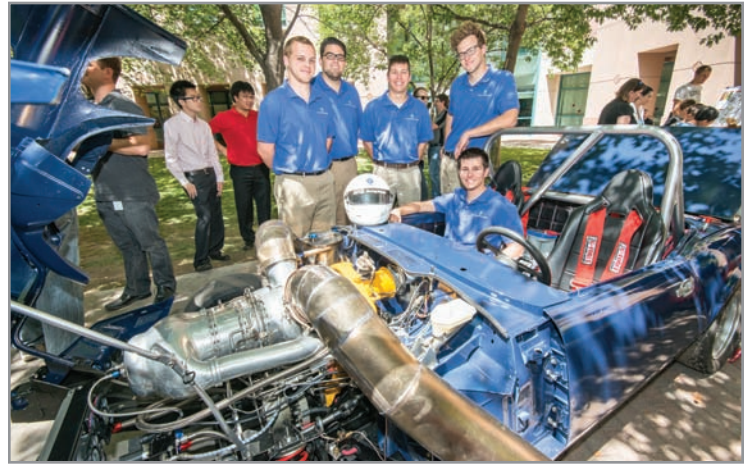


Photo: Bill Lax

Gas Tank—Turbine Roadster Test Platform team members stand by their turbine-powered 1977 Triumph Spitfire at Design Day 2013.

In addition, a portable incubator for antimicrobial susceptibility testing in resource-limited areas, which won Best Design Documentation, may well have moved the lab-on-a-chip concept closer to reality. The process will help physicians rapidly and cost-effectively identify the best antibiotics for treating various bacterial infections.

Whether or not the students received prizes, College of Engineering Associate Dean of Academic Affairs Jim Baygents said, "You are all winners, and we are all very proud of you." All of the awards, which are listed below, included cash prizes totaling \$11,400.

Among the project sponsors were Airtronics Inc., BAE Systems, B/E Aerospace, Boeing, Bosque Engineering, Caterpillar, Continental Automotive Systems, General Electric, Honeywell, NASA, Northrop Grumman, Raytheon, Texas Instruments, Tucson Embedded Systems, Ventana Medical Systems, and W.L. Gore and Associates.

Design Day Prize Winners

Best Overall Design, First Prize • \$1000

The robotic fish

Design team: Charles Leichner, Clayton Stewart, Yi-Chieh Chen, Hannah Grant, Mohamed Khairy, Robbie Laity

Project sponsor: MediaMation Inc.

Prize sponsor: BAE Systems

Best Overall Design, Second Prize • \$750

Thermal optical test chamber

Design team: Ivan McCrea, John Davis, Hafez Gharbiah, Leah Childers, Lajos Pelikan, Chris Miller

Project sponsor: Lincoln Laboratories, MIT

Prize sponsor: BAE Systems

Best Analog Design • \$1000

Fully automated beer cooling and dispensing system

Design team: Ryan Kovalchick, Nicole Rojas, Tim May, Danny Armenta, Michael Sato, Kyle Burke

Project sponsor: Texas Instruments

Prize sponsor: Texas Instruments

Innovation in Engineering • \$1000

Hydroponic barley fodder system

Design team: Paola Espinoza, Katie McCracken, Greg York

Project sponsor: Bosque Engineering LLC

Prize sponsor: Ventana Medical Systems Inc.

Blunder Education Prize • \$750

The robotic fish

Design team: Charles Leichner, Clayton Stewart, Yi-Chieh Chen, Hannah Grant, Mohamed Khairy, Robbie Laity

Project sponsor: MediaMation Inc.

Prize sponsor: Edmund Optics

Best Use of Prototyping • \$750

High-flow breather valves

Design team: Paul Foss, Scott Harlow, Josh Jakary, Marc Spencer, Gerard Torres

Project sponsor: AGM Container Controls

Prize sponsor: PADT

Best Engineering Analysis • \$750

Data-acquisition system vibration and weather protection

Design team: David Ashton, Axel Monroe, John

Nguyen, Beau Peterson, Oscar Rico, Shanna Tune

Project sponsor: Caterpillar Inc.

Prize sponsor: Raytheon Missile Systems

Best Presentation • \$750

Jupiter: joined-wing UAV providing intelligence, targets, and emergent reconnaissance

Design team: Calvin Cheung, Brendan Clasby, Juan Duarte, Sean Gellenbeck, Andrew Law, Peter Smith, Hari Subedi

Project sponsor: Hermann Fasel/UA Aerial Robotics Club

Prize sponsor: Rincon Research Corp.

Best Design Documentation • \$750

Portable incubator for antimicrobial susceptibility testing in resource-limited areas

Design team: Jeremy Amorin, Yezhou Chen, Vineet Dixit, Darl Heidenreich, Erica Isaacs, Ingrid Noche

Project sponsor: University of Arizona

Prize sponsor: Technical Documentation Consultants of Arizona

Voltaire Design Award • \$750

Hybrid rocket engine test stand

Design team: Brian Franz, Doug Mason, Daniel

PICTURE GALLERY

Engineers Week 2013 Photo Contest

We asked students, staff and faculty to submit their favorite photos of E-Week to the College Facebook page. The winners are below (yes, it snowed).



Photo: Society of Women Engineers



Courtesy of SmithGroupJJR



Photo: Engineers Without Borders



Photo: Mia Schnaible



Photo: Soc. of Hispanic Professional Engineers

New Engineering Innovation Building

Above is the most recent architectural design for the new Engineering Innovation Building, scheduled for completion in 2015. The building will showcase our research on biomedical devices, and on the groundbreaking work we are doing on materials, manufacturing and infrastructure, and provide students with space for senior design and club construction projects.

Murphey, Spencer Sasarita, Robbie Schultz

Project sponsor: UA AIAA

Prize sponsor: Sargent Aerospace & Defense

Best Creative Solution • \$750

Rapid temperature-gradient-based wire-guided PCR

Design team: Avi Kaze, Wenyue Li, Lin Ma

Project sponsor: UA Biosensors Lab, Jeong-Yeol Yoon's Research Group

Prize sponsor: W.L. Gore & Associates

Best Physical Implementation of an Analytically Driven Design • \$500

High-force damper test

Design team: Paul Fielding, Yasmine Straka, Ben Madrid, Hyun Jun Ji, Spencer Figge, Mario Valdez

Project sponsor: Airtronics Inc.

Prize sponsor: Latitude Engineering

Most Innovative Systems Integration • \$500

Disposable low-power blood glucose meter

Design team: Ashley Anhalt, Melvin Barney, Melissa Lim, Pooja Rajguru, Brian Suarez, Daniel Sweeney

Project sponsor: Texas Instruments

Prize sponsor: Los Hermanos/Northrop Grumman Trust

Best Team Leadership 1 • \$250

Disposable low-power blood glucose meter

Design team: Ashley Anhalt (winner), Melvin Barney, Daniel Murphey, Pooja Rajguru, Brian Suarez, Daniel Sweeney

Project sponsor: Texas Instruments

Prize sponsor: Honeywell

Best Team Leadership 2 • \$250

Hybrid rocket engine test stand

Design team: Brian Franz (winner), Doug Mason, Daniel Murphey, Spencer Sasarita, Robbie Schultz

Project sponsor: UA AIAA

Prize sponsor: Honeywell

Excellence in Aerospace Electronic System Design • \$250

Thermal energy extraction methods for UAV gliders

Design team: Rohit Umashankar, Samuel Blake, Jacob Estabrook, Meghan Folley, Kenneth Noble, Celina Thaxton

Project sponsor: UA Aerospace and Mechanical Engineering Department

Prize sponsor: Honeywell Aerospace

Best Printed Circuit Design • \$250

Competitive autonomous underwater vehicle

Design team: Alexander Abel, Evan Briones, Kevin Forbes, Kevin Geisler, Cliff Mai, Sean Topping

Project sponsor: AUVUA

Prize sponsor: Prototron Circuits

Fish Out of Water, First Prize • \$250

Disposable low-power blood glucose meter

Design team: Daniel Sweeney (winner), Ashley Anhalt, Melvin Barney, Melissa Lim, Pooja Rajguru, Brian Suarez

Project sponsor: Texas Instruments

Prize sponsor: Kristy Pearson

Fish Out of Water, Second Prize • \$150

Disposable low-power blood glucose meter

Design team: Pooja Rajguru (winner), Ashley Anhalt, Melvin Barney, Melissa Lim, Brian Suarez, Daniel Sweeney

Project sponsor: Texas Instruments

Prize sponsor: Kristy Pearson

EPA Taps Shane Snyder for Drinking Water Expertise

UA chemical and environmental engineering professor Shane Snyder is lending his expertise to the U.S. Environmental Protection Agency and in the process giving the Southwest's unique water issues a national forum.



Shane Snyder

Snyder, co-director of the Arizona Laboratory for Emerging Contaminants and a member of the UA's BIO5 Institute, will be working with an EPA Science Advisory Board committee that answers directly to EPA Administrator Lisa P. Jackson on policies that keep drinking water safe for everyone in the nation.

"Dr. Snyder's nationally recognized expertise in drinking water issues, and his focus on the identification, fate, and health relevance of emerging water pollutants, will be a great asset to the SAB Drinking Water Committee," said Vanessa Vu, director of the EPA Science Advisory Board staff office.

"This is a tremendous honor, to be invited and chosen," Snyder said of the three-year appointment, adding that it is also an opportunity to advise the agency on water issues specific to the arid Southwest. "The water needs of this part of the country are different from the rest of the nation," he said.

The federal appointment capped an industrious 2012 for Arizona's leading authority on drinking water contaminants. Snyder's work has been featured in national media, recognized by the professional community, and earned him an audience with global leaders.

Snyder also earned best paper honors from the American Water Works Association for research that will help establish new chlorine handling and on-site chlorine production best practices for municipal water utilities. The guidelines are expected to aid water treatment professionals in minimizing contaminants commonly found in drinking water. Snyder joined the UA College of Engineering faculty in 2010.



Photo: UA Communications

Feather in Cap—University Distinguished Professor Paul Blowers, wearing the cap and gown, is supported by a few of his students at the induction ceremony.

CHEE's Paul Blowers Inducted as University Distinguished Professor

Paul Blowers, of the UA department of chemical and environmental engineering, was formally inducted Dec. 6 as a University Distinguished Professor.

University of Arizona President Ann Weaver Hart and the Arizona Board of Regents presented the award to Blowers at



an induction ceremony on the UA campus. This is the fourth consecutive year that a member of the UA College of Engineering faculty has been made a University Distinguished Professor.

"Our Regents' and University Distinguished Professors exemplify the spirit of innovation that drives our university, state and country forward," Hart said of this year's inductees.

When Blowers learned earlier in the year that he was to receive the UA's highest teaching honor for doing something he loves, he described the recognition as "amazing."

"To be surrounded by colleagues who engage so many of our students in undergraduate research, to work with peers who challenge and support students in the classroom, and to have the support from the administration," Blowers said. "All lead to me enjoying my work every day."

"Paul has a unique gift in motivating students to become enthusiastic about their future careers," said UA chemical and environmental engineering head Jim Field. "Students know they are going to get the best advice from Dr. Blowers, and, as a result, the long lines of students waiting for a consultation with him are a permanent fixture in the landscape of our department," he told the audience at the induction ceremony.

Baseball Science Program Urges Students to Follow STEM Education

A program that uses America's favorite national pastime to encourage at-risk middle school students to improve their academic performance is under way at the UA.

The Arizona Science of Baseball program introduces middle school students to physics and statistics via the game of baseball to encourage classroom participation and help students with the challenges of science, technology, engineering and math – STEM subjects – in school.

"The program utilizes baseball to interest middle school boys and girls, to help them overcome intimidation from math and science," said Ricardo Valerdi, founder and director of the program and an associate professor of systems and industrial engineering. "The goal is to develop future scientists and engineers by establishing a connection among baseball and statistics, geometry, human performance, nutrition and other technical aspects of the game."

Twenty students from Mansfeld Middle School took part in the inaugural class. Participants engaged in hands-on classroom sessions at the UA in the mornings and baseball drills in the Mansfeld ballfields in the afternoons.

The program includes academic and athletic instruction. The academic component has four sections, each organized around a fundamental baseball skill: running, hitting, fielding



Photo: UA Communications

Big Hitter—Arizona Baseball head coach Andy Lopez prepares students for an encounter between physics and baseball during the Arizona Science of Baseball classroom session.

and throwing. Sections include lessons in math, science, history and social studies.

The Arizona Science of Baseball program involves volunteers from industry, undergraduate UA engineering students, UA Athletics, and local high school students. It is modeled after a similar program at MIT in Cambridge, Mass.

Said Valerdi: "The long-term objective is to train middle school teachers so that they can implement the program at their schools."

Watch the video, "Arizona Science of Baseball," at http://youtu.be/fRoT_y9NkTc.

Krunz Collects Further Honor with IEEE Award

Marwan Krunz, a professor in the UA department of electrical and computer engineering, continues to amass awards and lead research in communications technology and networking. Most recently, the Communications Society of the Institute of Electrical and Electronics Engineers, or IEEE, named Krunz a 2013-2014 distinguished lecturer.

"I am humbled by the company I am in: some of the world's most accomplished researchers in communications technology," said Krunz of the prestigious and highly competitive honor.

The two-year appointment recognizes renowned authorities in their fields and



Marwan Krunz

protocol design. Among his planned speaking topics is dynamic spectrum access, or DSA, models to remedy the lack of available wireless spectrum.

"This is an opportunity to share with more schools what we are doing here at the UA in a more formalized way," said Krunz.

Contrary to popular belief, researchers report no scarcity of radio frequencies

funds worldwide travel for speaking engagements. Krunz's research emphasis is on optimal resource allocation, adaptive control, and distributed

for new wireless services. Rather, existing resources are being managed inefficiently, leaving much of the communications spectrum lying idle the majority of the time.



Krunz and his research team are investigating technologies associated with DSA that facilitate real-time sharing of spectrum resources. DSA holds the promise of overcoming spectrum shortages by allowing nonlicensed entities to transmit data on underused licensed frequencies.

Krunz was named an IEEE fellow, the highest grade of membership possible in the institute, in 2010 for his contributions to resource management policies in wireless networks.



Photo: Pete Brown/UA Engineering

Celebrating 125 Years and the New Face of Mining

Special commentary by **Mary Poulton**, head of the department of mining and geological engineering and director of the UA's Lowell Institute for Mineral Resources, to mark 125 years of mining engineering at UA.

Arizona's territorial legislature had the foresight in 1885 to approve the creation of the University of Arizona's founding schools of agriculture and mining. The School of Mines welcomed its first student in 1888.



Year of Celebration

Now, 125 years after the first mining student walked up the steps of Old Main, it is with immense pride that I invite you to celebrate the new face of mining. Throughout 2013 the department of mining and geological engineering, or MGE, will be hosting special events for those who have made, and kept, us great: our students, alumni, faculty, industry partners, and friends. We will publish a series of articles on topics such as women in mining, technology and automation, urban mining, critical minerals, how the world depends on mining, and environmental policy and social responsibility.

From Mules to Robotics, Our Purpose Steadfast

The exceptional workforce in training of 1888 was learning how to consider



Mary Poulton

assay and other technical services to a growing industry scattered across 113,000 square miles of hostile territory; today the mining and geological engineering department is transferring technology and knowledge worldwide via lectures streamed online, startup companies, licensing agreements, and short courses.

Using an extensive mineral collection they created themselves, School of Mines faculty traveled the territory and nation 125 years ago by horse and carriage to teach the public about the region's mineral wealth. That mineral collection is now one of the largest university collections in the United States, and today MGE education outreach programs touch more than 6,500 students and teachers every year.

mules for material haulage; today students are learning robotics, automation, and positioning technologies. In 1888 the School of Mines was providing

Students at the Heart of UA Mining Programs

Students are, and always have been, at the heart of UA mining and geological engineering programs. MGE has remained small enough to accommodate the family environment that students and faculty value; yet the department has diversified over the years to meet the changing needs of the industry. Each year more and more female mining and geological engineers and students with minority backgrounds are among the graduates.

All MGE students meet stringent admissions standards, are certified in underground mine safety, and have good job offers before they ever collect their diplomas. They work with developing technologies, study abroad, and get hands-on experience at the University's San Xavier Underground Mining Laboratory, one of only a few student-managed mines in the world.

MGE students have performed at Carnegie Hall, served in our armed forces, and are the changing face of mining. Welcome to the 125th anniversary celebrations!

Arun Ravi

Arun Ravi graduated in 2002 with a bachelor's in computer engineering, and currently lives in San Francisco. He left the healthcare consulting business to develop a mental health wellness tool that analyzes how web content affects the emotional state of people, especially young people, browsing the Internet. We talked to him about his time at UA and his journey to this new venture, www.mevoked.com.

How has your UA education benefited you?

UA gave me the foundation I needed to succeed. It was a combination of great professors, classmates and environment.

What are your favorite memories from your time at UA?

Going with my friends to the basketball and football games. I lived in La Paz

right behind the football stadium so every Saturday was insane!

Tell us something about yourself that people might be surprised to learn.

I quit my job to start a company.

Tell us about your hobbies and pastimes.

I love UA sports and do my best to find time and watch them play. Other than that I love being outdoors and do my best to go do something outside whenever I have a chance.

What are your hopes for the future of UA?

That it goes from strength to strength and the brand of students coming out gets better and better. UA was a great experience and I want other people to be able to build lasting memories there.

Describe something noteworthy you have experienced since graduating.

Starting my company Mevoked has been a remarkable journey. Mevoked



Arun Ravi

uses online behavior analytics to measure and manage mental health in children. Our software tool determines the emotional state of mind of the user by analyzing their

browsing patterns/content consumed passively. We then make that data actionable for the parent and the child. We want to change the way mental health is detected and potentially treated.

What else would you like our readers to know?

UA has given me an amazing foundation to build on, and I wouldn't do anything differently.

Matthew M. McDole

The American Society of Civil Engineers awarded Matt McDole the 2012 Francis C. Turner Award for his contribution to the advancement of the knowledge and practice of transportation engineering. He is a registered professional engineer and a fellow of the American Society of Civil Engineers.

McDole has served with distinction in the transportation industry for more than 40 years, and he is internationally known for his extensive experience and dedication to the industry, specifically in U.S. public transit. He graduated from the University of Arizona in 1962 with a bachelor's degree in civil engineering.

His experience spans the Southern Pacific Railroad to the San Francisco Bay Area Rapid Transit District to the Denver Regional Transportation District. He is a Denver resident, and currently a consultant on Salt Lake City's light rail system; he is also



Matt McDole

developing a state rail plan for the Colorado Department of Transportation.

McDole has served the American Society of Civil Engineers in numerous positions at

section and national levels. He was president of the Transportation & Development Institute in 2008-2009 and chairs the institute's rail and public transit council. He is also active in other professional groups, such as the Transportation Research Board of the National Academies and Design-Build Institute of America.

McDole is vice president of transportation services for consulting firm LS Gallegos & Associates in Denver, where he lives. He talked to *Arizona Engineer* about his time at UA Engineering.

How has your UA education benefited you?

Pursuing civil engineering at UA was a natural for me. My dad was a CE grad at UA and had a long career with the Southern Pacific Railroad. He was a highly respected engineer in Arizona (with low three-digit PE number) and was a great role model for me. My engineering education at UA was the foundation for a very interesting and rewarding career.

What are your favorite memories from your time at UA?

One is my senior design project. Two fellow students and I designed a new alignment of about three miles for the Southern Pacific Railroad line east of Benson, Ariz., that reduced the number of curves from 21 to three. Southern Pacific provided the aerial photography for the base map, and we plotted a huge contour map of the area on the UA's new Kelsh plotter, overseen by professor Phil Newlin. When Southern Pacific's president saw the work he said, "Build it."

continued on page 14

ALUMNI

William Scott (“Scotty”) McClary • BS/EE 1962

After graduation, Scotty McClary started a career in digital communications that took him from Tucson, Ariz., to Washington, D.C., to Florida, where he now lives, semi-retired, in Delray Beach with his wife, Lynn.

McClary started out as a communications engineer for Bell Aerosystems in Tucson, and then URS, which transferred him to Falls Church, Va., where he was lead engineer and project manager for the Department of the Army Inventory Control System. In 1973 he went to work for Computer Sciences Corp. in Falls Church, where he was lead engineer

and project manager for communications systems for several government departments and agencies. He transferred to Miami in 1984 to oversee development of an automated air and sea cargo clearance system for Miami International Airport and the Port of Miami. “Living in South Florida put sand in our shoes,” McClary said. He became a certified Scuba diver and instructor, and owned his own dive business.

“In my spare time, I am an avid reader and enjoy spending time with my son and daughter,” McClary said. “I am very proud that my two granddaughters, Kaycee and Jessica, are following the tradition by



Photo courtesy of Scotty McClary

Wildcat Family—Scotty and Lynn McClary, left, attended the 2011 UA graduation of their older granddaughter, Kaycee, in cap and gown, accompanied by younger granddaughter Jessica, who graduates in 2013. “I am happy to report that we carry on the tradition in our Wildcat family!” said Scotty.

becoming UA graduates.” Kaycee graduated from UA in December 2011 with a major in creative writing and a minor

in pre-law thematic. Jessica will graduate in December 2013, majoring in psychology with a minor in French.

Matt McDole Profile

continued from page 13

Upon graduation this project was my first job – doing surveying, material testing and construction inspection. A great experience – to go from design through construction.

Tell us something about yourself that people might be surprised to learn.

I moved several times time in my career to relocate for transportation projects. This includes moving to San Francisco three times and to Denver twice. But I still have roots in Tucson, Ariz., as my hometown. I was born and raised in Tucson and usually get back several times each year. I hope to spend more time there after retiring.

Tell us about your hobbies and pastimes.

I follow UA sports and watch games when I can, on TV or in person. I have enjoyed playing some myself: baseball, basketball and tennis. I like skiing,

snowshoeing, hiking and camping. Model railroading is also a hobby, and I’m involved in professional organizations, the primary one being the Transportation & Development Institute of ASCE.

What are your hopes for the future of UA?

I hope the football team will finally make it to the Rose Bowl, and that the basketball and baseball teams win more national championships. I hope UA will maintain a record and reputation of excellence in engineering education.

Describe something remarkable or noteworthy you have experienced since graduating.

I have been very fortunate to attend UA and to have an enjoyable and gratifying career in transportation engineering and construction. It has been my good fortune to work on some great projects, including the Palmdale-Colton Cutoff (a 79-mile rail line to bypass Los Angeles),



San Francisco BART station: 24th St. Mission

the Denver area E-470 toll road, and the San Francisco BART. I have held the top engineering position (chief engineer or equivalent) at three transportation agencies, and I’m proud that my career achievements were recognized by the 2012 ASCE Francis C. Turner Award.

What else would you like our readers to know?

In addition to a good education, I think professional registration and continuing education are keys to opportunities in a civil engineering career.

OBITUARY

Jack Riddle BS/CE 1951

John "Jack" Albert Riddle passed away December 23, 2011, age 84 at his home in Bisbee, Ariz., after an illness. He was born in Bisbee on July 24, 1927. His father, Albert Riddle, worked as a blacksmith for Copper Queen Mining Company for 45 years; his mother, Mamie Isaacson Riddle, was an elementary school teacher in Cochise County for 50 years.

Jack Riddle graduated from Bisbee High School in 1945 and enlisted in the U.S. Army Air Forces. He learned surveying and served at Sheppard Field near Wichita Falls, Texas; at Geiger Field near Spokane, Wash.; and at Hickam Field in Hawaii. After serving for two years he returned to Arizona, and graduated from the University of Arizona with high distinction in 1951 with a bachelor's degree in civil engineering. He was an engineer with

McKee Construction, Asarco and Anaconda, and while on an overseas assignment in Potrerillos, Chile, he met his wife of 44 years, Silvia Iriarte, who preceded him in death in 2004. Upon returning to Bisbee, Riddle managed a Western Auto store for a few years and then began work with Phelps Dodge in 1964. He worked as pit engineer, chief pit engineer, chief underground engineer, assistant mine superintendent and mine superintendent.

When Bisbee mine operations ceased in 1975, Phelps Dodge named him mine superintendent for the new underground copper mine in Safford, Ariz. Riddle retired from Phelps Dodge in 1981 and moved back to Bisbee, where he worked as a consultant for the mining industry for 16 years. He retired again in 1997.

In 1998, Riddle began a 13-year stint volunteering at the Bisbee Mining and



John "Jack" Albert Riddle

Historical Museum. His great familiarity with mining and geology combined with his fine organizational ability, cheerfulness and great penmanship contributed to building a useful and pragmatic library that has helped thousands of visitors.

Riddle is survived by his son and daughter-in-law, Sergio and Ulrike Riddle of

Raeford, N.C.; his daughter and son-in-law, Yvette and Matthew Gengler of Tucson, Ariz.; his daughter and son-in-law, Anita Riddle and Steven Schmidt of Fairfax, Va.; and five grandchildren. Daughter Yvette began work as a geological engineer with Independent Mining Consultants of Tucson in 1985 and continues there today.

CONNECT WITH UA ENGINEERING

It has never been easier to get all the latest news and information about the people and programs at UA Engineering



FACEBOOK
www.facebook.com/UACollegeofEngineering



TWITTER
<http://twitter.com/azengineering>



YOUTUBE
www.youtube.com/user/uaeng



EMAIL NEWSLETTER
www.engr.arizona.edu/alumni/index.php?ID=64

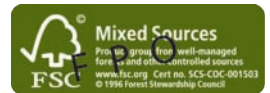


RSS FEED
<http://engr.arizona.edu/news/media/rss.xml>

The University of Arizona
College of Engineering
P.O. Box 210072
Tucson, AZ 85721-0072

azengineering

NONPROFIT ORG
US POSTAGE PAID
TUCSON AZ
PERMIT NO. 190



Scan these tags with your mobile device for instant access to **Arizona Engineer Online**

Download the free Microsoft tag (left) reader from <http://gettag.mobi> to your mobile device and start reading *Arizona Engineer Online* on the go right now. Or download the QR code (right) reader app from your favorite app store. You'll get instant access to the full range of multimedia – videos, photos, information, websites, reports, and more – available online at www.engineering.arizona.edu/news.



Have you been in the news recently?

Let us know if you've been getting some media attention. Just email the URL to us and we'll continue to spread the news via the College website and this magazine.



SEND US AN EMAIL!

Where has life taken you since graduation? We'd like to know and so would your former engineering classmates.

Please email us (300 words or less) and include the following information:

- Name and year you graduated
- Major
- Degree (BS, MS, PhD, etc.)
- Details of your activities

Don't forget to include a digital picture of your family, latest project at work, or that boat or hot rod you just finished building in your garage. Vacation photos are great, too. We'll publish your news and photos online and in the next print edition.

Please send your e-mail to pnb@email.arizona.edu