

ARIZONA engineer

Vol. 31 • No. 1

Visit our web pages at <http://www.engr.arizona.edu>

Spring 2008

Predicting the unpredictable

\$2.2 million grant calls for designing software to analyze intelligence data and develop strategies

Electrical and Computer Engineering Prof. Jerzy Rozenblit has received a \$2.2 million grant to design computer software to analyze volatile political and military situations.

The software will predict the actions of paramilitary groups, ethnic factions, terrorists and criminal groups, while aiding commanders in devising strategies for stabilizing areas before, during and after conflicts.

It also will have many civilian applications in finance, law enforcement, epidemiology and the aftermath of natural disasters, such as hurricane Katrina.

The Asymmetric Threat Response



Matt Brailey

and Analysis Project, known as ATRAP, is a massively complex set of computer algorithms (mathematical procedures) that sift through millions

of pieces of data, considering many factors including social, political, cultural, military and media influ-

Continued on Page 19

Thomas R. Brown Family Foundation endows faculty chairs

The Thomas R. Brown Family Foundation has donated \$4 million to The University of Arizona to endow two faculty chairs — one in the College of Engineering and one in the Eller College of Management. Each college has received a \$2 million gift.

Tom Brown, Tucson's most successful high-tech entrepreneur, died in 2002. Since that time, the Brown family, through its foundation, has been a strong supporter of technology and management at UA.

Tom Brown and his friend, Page

Burr, founded Burr-Brown Corp. in 1956. Texas Instruments acquired Burr-Brown in June 2000 for the highest price ever paid for an Arizona company.

"Burr-Brown grew to be a multi-billion-dollar enterprise because the people there were internationally competitive," said Sarah Brown Smallhouse, one of Tom Brown's daughters and president of the Brown Family Foundation.

"They had the talent to both understand technology and management

principles, and — in the context of a corporate culture that valued excellence and innovation — the company thrived.

"The University of Arizona was a key partner in the success of Burr-Brown, and our trustees feel that helping to strengthen the university faculty in engineering and management is an appropriate way to give back to a community partner that made so much of Burr-Brown's success possible," she said.

Continued on Page 11



© UA/Robert Walker

UA engineers tackle infrastructure woes

They ease Twin Cities traffic problems and develop ways to retrofit bridges

One of the most rewarding aspects of an engineering career is the opportunity it affords us to make significant contributions to society. Nowhere is that more evident than in the contributions engineers make in the aftermath of tragic events.

Last July, 11 people died when an interstate highway bridge collapsed between Minneapolis and St. Paul, Minn. Thousands of other Minnesotans were significantly inconvenienced by the loss of this IH-35W bridge, a major arterial that carries 140,000 vehicles daily.

This tragedy highlights the huge infrastructure problems facing the United States and the challenges and opportunities we face as engineers.

This country experienced incredible growth and expansion in its highway and bridge infrastructure in the 1950s, '60s and '70s. Today, those structures are deteriorating, and many need repair and or replacement.

These highways are the lifelines of our country and we don't have the luxury of making repairs and replacements in the absence of significant traffic demands.

Engineering Faculty Help Out

Three members of our Civil Engineering faculty recognized these infrastructure problems early on, conducted research over several years, and are now in a position to make significant contributions to solving these problems and others.

Professor Yi Chiang Chiu designs and builds sophisticated computer simulations that predict traffic patterns under the influence of complicated urban scenarios, including accidents, loss of arterials, and natural disasters. The Minnesota Department of Transportation has asked Chiu to model traffic flow and to devise efficient strategies for rerouting traffic while the IH-35W bridge is being replaced.

While Chiu's work will help MDOT mitigate some of the immediate traffic woes, two other UA Civil Engineering faculty members have developed technologies that could benefit transportation departments across the nation as they grapple with upgrading aging structures.

The Minnesota tragedy has taken the discussion of infrastructure maintenance and repair out of the academic journals and traffic engineering publications and placed it squarely on the evening news.

The general public now recognizes the need for maintenance, repair and replacement of bridges and that hundreds of billions of dollars in potential expenses and liabilities are involved.

Reliable methods to retrofit existing bridges, particularly methods that can return the bridges to structurally "as new" condition, offer tremendous advantages.

Retrofitting Solutions

Professors Hamid Saadatmanesh and Mo Ehsani have developed relatively inexpensive ways to do this using composite materials to strengthen existing bridges quickly and without major traffic disruption.

It is particularly gratifying for me, as dean of the college, to see the significant ways in which these members of our faculty and many others are contributing to society. Solving societal problems is what we do in engineering, and it's great to be part of such a rewarding profession.

While we're talking about contributing to society, I want to express my particular pride in Jay Alexander, one of our undergraduate students in Materials Science and Engineering.

He donated a large part of his time this past summer to raise money for Habitat For Humanity.

Jay and 28 of his soon-to-be-closest-friends participated in the Habitat Bicycle Challenge. On June 1, the group left New Haven Conn. and

peddled for eight weeks and three days to Seattle, Wash.

The ride left Jay in the best shape of his life and with an experience that most of us only dream of. And his ride contributed to providing housing for people who otherwise could not afford it. This put Jay's effort squarely in the best traditions of engineers, whose job it is to make life better for us all.

Using 'More info'

At the end of several stories in *Arizona Engineer*, you'll find a word or phrase under "More info." You can use this phrase to search for a longer version of that story at <http://uanews.org/section/Science+and+Technology>. Type the word or phrase into the search box at the top right of the web page and click the magnifying glass icon.

ARIZONA

Engineer

Spring 2008

Vol 31 • No. 1

Arizona Engineer is published twice yearly for alumni and friends of The University of Arizona College of Engineering.

•
Editor/Writer: Ed Stiles

Photographer: Matt Brailey

•
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.

•
Arizona Engineer, The University of Arizona, College of Engineering, P.O. Box 210072, Tucson, AZ 85721-0072
E-mail: stiles@u.arizona.edu
Phone: 520-621-6594

•
All contents ©2008 Arizona Board of Regents. All rights reserved.

News Briefs

Students win \$13,500 in cash awards during Engineering Design Day

Student engineers won a total of \$13,500 in 18 award categories at UA's 2007 Engineering Design Day.

Design Day 2007 included 59 projects that were judged by more than 70 practicing engineers.

Some Design Day projects may eventually be commercialized. Others will provide important experimental data for companies that sponsored the projects or will become integral parts of ongoing engineering research projects at UA.

The awards included:

- Lockheed Martin Best Overall Design Award (\$1,000)
- Ventana Innovation in Engineering Award (\$1,000)
- BAE Best Overall Software Design (\$1,000)
- Texas Instruments Design Contest Award (\$3,000)
- Honeywell Team Leadership Awards (Two awards: \$250 each)
- Advanced Ceramics Research Best

UA Engineering videos on iTunes U

UA on iTunes U went live as the fall semester began.

The podcasting site offers downloadable courses, faculty lectures, recorded events and other programming to the public.

More than 20 videos from the College of Engineering are included on the web site. The engineering videos include an overview of the college, descriptions of student projects, a rundown on the summer engineering robotics camps, descriptions of engineering majors and more.

UA on iTunes U, which resulted from an agreement between UA and Apple Inc., provides a centralized access point in the iTunes Store for podcasts by UA faculty and instructors, departments and programs.

"UA on iTunes U is going to draw a great deal of attention to podcasting as an instructional and marketing resource," said Stuart Glogoff, UA Learning Technologies Center senior consultant.



Ed Stiles

Paul Prazak (right), of Texas Instruments, presents a check for \$3,000 to the winners of the Texas Instruments Design Contest. The team developed a self-contained sine wave source that connects to evaluation modules for testing Texas Instruments' analog-to-digital converter microchips.

Interdisciplinary Proof of Concept Award (\$500)

- Lockheed Martin Best Interdisciplinary Award (\$500)
- Veeco Best Optics Design Award (\$500)
- Western Design Center, Inc., Best Systems and Industrial Design Award (\$500)
- Best Aerospace Design Award (\$500)
- Best Application of Engineering Analysis to Aerospace Design Award (\$500)
- Most Creative Aerospace Design Award (\$1,000)

• Best Mechanical Engineering Design Award (\$500)

- Best Mechanical Engineering Fabricated Prototype Award (\$1,000)
- Most Creative Mechanical Engineering Design Award (\$500)
- Texas Instruments Best Overall ECE Design Award (\$500)
- Most Creative ECE Design Award (\$250)
- ECE Best Presentation Award (\$250)

•
More info: DD2007



Meg Askey

UA on iTunes U opened with an initial offering of podcasts made during the past year.

The podcasts include the prestigious College of Science lecture series on "Evolution: Our World Ourselves" and "Global Climate Change."

Also offered is the College of Fine Arts series on "Art and Identity."

In addition, departmental podcasts include those from the School of Information Resources and Library Science, and from the Office of Student Financial Aid.

To visit UA on iTunes U go to <http://itunes.arizona.edu/> and click on the "Go to UA on iTunes U" button.

Marcellin named Regents' Professor

The Arizona Board of Regents has named Michael Marcellin, of Electrical and Computer Engineering (ECE), to the rank of Regents' Professor.

Marcellin is an international expert on image compression and has played a key role in the movie industry's move to a standardized digital format.

Marcellin is also the International Foundation for Telemetry Professor in ECE.

In addition he is recognized as an exceptional teacher and has won outstanding-teacher awards on numerous occasions.

No more than three percent of tenured and tenure-track faculty at UA may hold the rank of Regents' Professor at any given time.



Michael Marcellin

Courtesy of Michael Marcellin

Three Navajo students earn Ph.D.s in engineering

In what may be a UA record, three members of Arizona's Navajo Nation graduated with Ph.D. degrees in engineering during a single commencement ceremony in May 2007.

All three grew up on northern Arizona's Navajo Reservation in homes that had no running water or electricity. Navajo, not English, was their first language.

Like so many Navajo college students, they missed their families and often had difficulty adjusting to life in what is in many ways a foreign culture. But they stayed on and succeeded in difficult technical fields rather than returning home after a semester or two.

Karletta Chief, Pete Littlehat, and Julius Yellowhair not only overcame those difficulties but excelled as students while studying at UA.

Chief came to UA on a National Science Foundation Fellowship, while Littlehat and Yellowhair were funded by the Alfred P. Sloan - American Indian Graduate Partnership.

The success of these students is part of the strong track



Courtesy of Karletta Chief

Julius Yellowhair (left), Karletta Chief (center) and Pete Littlehat after receiving their Ph.D. degrees during spring 2007 Commencement.

record at UA in enrolling and graduating Native American students. About 600 undergraduate and 200 graduate and professional Native American students attend UA, which ranks among the top five universities in the world conferring Ph.D.s to Native Americans.

•
More info: Karletta



Ed Stiles

The robotic cars are off and running in a drag race event during the engineering robotics camp.

Robotics camp is fun, educational

About 80 middle school students built robots during two summer engineering robotics camps at UA.

Judging by the noise and enthusiasm, they discovered the fun part of engineering as they built, programmed and raced robotic cars made from Lego Mindstorms Robotics Inventions System kits. The students used the sensors, motors, gears, Lego bricks and a programmable microcomputer found in each kit to create vehicles for several competitions.

They also learned to use SolidWorks 3-D mechanical design software and studied basic concepts in trigonometry and physics.

Creating enthusiasm for math and engineering is important when students are in middle school because that's when many students lose

interest in technical subjects, said Ray Umashankar, assistant dean for industrial relations in the UA College of Engineering.

"When students attend a robotics camp like this one, they learn that the math and science they've been learning in school isn't just an abstract subject but has real application to fun and creative projects," Umashankar said. "They suddenly realize that science and math have real value."

Texas Instruments and the Thomas R. Brown Family Foundation are the major sponsors of the camp, providing funds for the robotic kits and other expenses, as well as providing scholarships to some students who could not otherwise afford to attend the camp.

•
More info: Umashankar

Larry Head to lead SIE department

Larry Head has been named head of the UA Systems and Industrial Engineering Department.

Head is an internationally recognized expert in transportation systems and adaptive traffic signal control and brings to the department considerable research and industrial experience.



Larry Head

Courtesy of Larry Head

He served as an assistant professor in the SIE department from 1994 to 1997, when he left to become partner, senior vice president and director of research and development for Gardner Transportation Systems. Gardner Systems was acquired by Siemens in 2000, where Head then served as director of research and development for Siemens Energy and Automation.

Head succeeds Ron Askin, who served as SIE head from 1998 to 2006.



Storms like this one over the Grand Canyon will not come often enough to remedy severe water shortages in the Colorado River Basin caused by increasing population, global warming and normal drought conditions, according to a report issued by an NRC panel. The panel was led by Ernest T. Smerdon, former dean of UA Engineering.

Ed Stiles

Smerdon heads NRC panel on Southwestern water problems

Ernest T. Smerdon, former dean of UA Engineering, headed a National Research Council committee that issued a report on the hard choices water managers will face in the Colorado River Basin during the 21st century.

The report notes that population growth coupled with global warming and a 500-year-long history of drought in the Southwest will result in water shortages that cannot be addressed by conservation efforts and

technological innovations alone.

“The basin is going to face increasingly costly, controversial and unavoidable trade-off choices,” Smerdon said. “Our hope would be that the community and the decision makers will have planned before crises occur.”

New dams, cloud seeding, desalination, underground water storage and shifting water use from agriculture to urban users will help, Smerdon said. But population growth eventually will swamp these strategies, and harder

choices will have to be made. These may include extreme water conservation measures, such as rationing, limiting population growth and other regulations.

However, Smerdon emphasized that the committee report is not designed to dictate how communities will solve the water problem but to give them the scientific knowledge they need to make informed decisions.

•
More info: Smerdon

Sternberg Peak

Peak in Antarctica named for UA professor

UA Mining and Geological Engineering Prof. Ben K. Sternberg went to Antarctica as a geophysicist with the Ross Ice Shelf Project (RISP) during 1973-1974.

His contributions to the expedition and Antarctic research have now been officially recognized with a peak named in his honor in Antarctica’s Nebraska Peaks range.

The RISP office at the University of Nebraska initiated the peak-naming effort, which requires international cooperation among 46 countries under the Antarctic Treaty.

Sternberg joined the RISP as a graduate student at the University of Wisconsin, Madison, doing subsurface imaging with ground penetrating radar (GPR) and electrical resistivity surveys. These are the same techniques that are the focus of much of his



This photo of the Ross Ice Shelf shows Kerr Inlet in the foreground. Sternberg Peak is in the Nebraska Peaks range at the upper left.

United States Geological Survey

research today.

“Research in Antarctica is always a team effort,” Sternberg said. “I am proud of what we accomplished. The work we did on the Ross Ice Shelf is now playing a role in helping us to better understand global climate change, for example.”

•
More info: Sternberg Peak

Ray Umashankar advises NASSCOM

Ray Umashankar, assistant dean for industrial relations in UA Engineering, has been asked to serve as an advisor to the NASSCOM Foundation on matters pertaining to educational and employment initiatives in the United States.



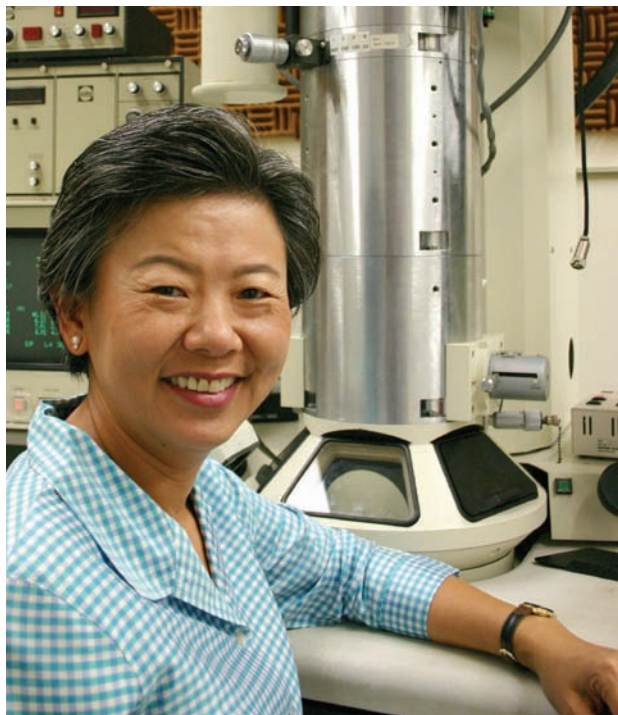
Ray Umashankar

The National Association of Software and Services Companies (NASSCOM) represents software and business process outsourcing companies in India.

“It is very important for Indian professionals in the U.S., to provide scholarships, internships and other support for students from ethnic minority groups,” Umashankar said.

Ed Stiles

Prof. Supapan Seraphin named 2007 da Vinci Fellow



Prof. Supapan Seraphin in the Materials Science and Engineering Electron Microscope Lab.

Matt Bralley

Prof. Supapan Seraphin has been named the 2007 da Vinci Fellow by the UA College of Engineering. The fellowship is sponsored by the Engineering College giving society, the da Vinci Circle.

Fellows are selected for their distinguished and sustained records in teaching, research and service. A new fellow is named each year. The fellows receive \$10,000 over the two-year span of their fellowship.

Seraphin, an expert in electron microscopy and carbon nanoclusters, directs the Electron Microscopy and x-ray facility in the Materials Science and Engineering Department. She is recognized throughout the Engineering College for her dedication to students and as an outstanding student mentor, working with students from middle school through graduate school.

Seraphin makes special efforts to support minority students, training them in electron microscopy and engaging them in her lab's research efforts.

Seraphin says she plans to use her fellowship money to partially support her graduate students' research and their travel expenses related to presenting research results at academic conferences.

More info: Seraphin

Cross-country tour

Jay Alexander had never been on an overnight bicycle trip before last June when he set out for a 3,900-mile-long pedaling odyssey that spanned the continent.

Alexander, a senior in Materials Science and Engineering, made the ride with 28 other cyclists to raise money for Habitat for Humanity. "I've been involved with Habitat for Humanity before, and so combining Habitat and biking for my last summer before graduation was a definite motivation for me," he said.

Along the route, there were hard days, a few easier days, and a glimpse into America's character.

"People were so generous; it was really amazing for me to see the American spirit," Alexander said.

More info: Alexander



Jay Alexander

Courtesy of Jay Alexander



Shell Oil President John Hofmeister and other Shell representatives met with Engineering College faculty and administrators for a morning conference before Hofmeister spoke at an energy seminar.

Ed Stiles

Shell president speaks on energy security

Shell Oil President John Hofmeister spoke at a seminar sponsored by the College of Engineering in August.

His visit was part of a 50-city tour in which he and other Shell leaders engaged in discussions with a wide variety of people on what it will take to meet the nation's energy challenge.

The oil industry has not done a good job of explaining the challenges of providing energy, Hofmeister said. The tour was designed to open a dialogue between Shell and the public to both educate people about the tough questions and issues related to oil independence and to seek out public

opinion on the issue.

Hofmeister supports a full array of energy sources. In addition, he encourages development of clean fossil fuels and alternative and renewable energy sources, while conducting business in socially and environmentally responsible ways.

In addition to increased production and new technologies, the energy security problem needs to rely on changing the way that products are designed, he said.

John Hofmeister was named President of Houston-based Shell Oil Co. in March 2005.

News Briefs

Michelin Award

Mining Engineering senior wins \$3,000 essay contest

Michael Ellis, a senior in Mining Engineering, is one of two winners of the Michelin Mining Essay Contest, which comes with a plaque and \$3,000 award.

Students were asked to write an essay on the competitive strength of the North American mining industry compared to other mining locations around the world.

The Michelin Mining Essay Contest is designed to provide prizes to mining engineering students throughout the U.S. and Canada, and help support future leaders of the mining industry.

Michelin started the essay contest



Michael Ellis, second from right, with the plaque he won for writing a winning essay in the Michelin Mining Essay Contest. With him are, from left, Mary Poulton, department head in UA Mining and Geological Engineering; Bob Roth, key account manager, Michelin Earthmover Tires; and Bill VanSomeren, director of marketing and sales, surface mining segment, Michelin Earthmover Tires.

in 2005 to provide support to future mining engineers and mining professionals.

Rob Knowlton, a Mining Engineering senior from Queen's University in Canada, was the other winner.



The members of one of UA's winning teams stand behind their display during Engineering Design Day, which showcases engineering senior projects at the end of each spring semester. Their display included a scale model of a Raytheon JSOW missile.

UA students win first place in two Raytheon contests

Two teams of UA mechanical engineering students have won mechanical design competitions sponsored by Raytheon Missile Systems (RMS) and its customers.

The fifth annual Air-to-Air Group Senior Mechanical Design Competition was sponsored by RMS and the U.S. Air Force. The first RMS Strike Division Senior Mechanical Design Competition was sponsored by RMS and the U.S. Navy.

Both competitions centered on real-world design problems, and many of the students' design solutions are likely

to be implemented by Raytheon.

The RMS Strike project involved modifying part of the structure for Raytheon's Joint Stand-off Weapon (JSOW) airframe. The students were asked to reduce the weight of a part of the airframe called the "strongback" without compromising critical interfaces or structural integrity.

The air-to-air team re-designed three connectors on a missile communications harness to make it easier to repair.

•
More info: JSOW

Poulton helped write NRC minerals report

Prof. Mary Poulton, department head in Mining and Geological Engineering, is one of the authors of a National Research Council (NRC) report on minerals and materials that are critical to the nation's economy and defense.

The report concluded that neither the federal government nor industry leaders have accurate information

on how secure those supplies are.

It also noted that a supply of critical materials stockpiled for national defense is inadequate for handling defense emergencies.

The report recommended that the United States Geological Survey or another national agency be funded to collect information on minerals.

Poulton helped prepare the report and, in particular, worked on the chapter dealing with availability and reliability of mineral supplies.



Mary Poulton

Ed Stiles

Ed Stiles

Ed Stiles

Homecoming

44th Annual Engineers' Breakfast

IBM wins award for bringing most alums, outstanding alumni receive awards

The annual Engineers' Breakfast continued to grow in 2007, with more than 700 alums, faculty, graduating seniors and friends of the College in attendance.

UA President Robert Shelton greeted the crowd and said, "When you think about what makes for a powerful university, like this university, it is that sense of connection to working on issues that are of importance to society. No college exemplifies that better — in its alumni, in its connections to the private sector — than the College of Engineering."

Chris Vlahos, president of the UA Alumni Association joined Tom Peterson, dean of UA Engineering, in presenting awards to alums Paul Prazak and Ray Haynes (see story below).



Photos by Ed Stiles

Cindy Grossman (right), IBM vice president for Tape and Archive Storage Systems, accepts the coveted license-plate-holder award from UA Engineering Dean Tom Peterson. The award is given each year to the company that brings the most engineering alumni to the Engineers' Breakfast.

Following the awards ceremony, James R. Moffett, chairman of Freeport-McMoRan Copper & Gold, Inc. gave the keynote address. He spoke on *Going Global*. Freeport-McMoRan recently acquired Phelps Dodge Corp. and is now the world's largest publicly traded copper company.

The breakfast festivities also featured the 10th annual competition between IBM, Raytheon, Honeywell and Texas Instruments for bringing the most alumni to the breakfast.

This year, IBM had more than 90 alumni, just edging out Raytheon, which placed a close second.

Engineering and UA Alumni Association honor outstanding alums

Paul Prazak, EE '73, and Ray Haynes, AE '67 and MBA '70, were honored by the UA Alumni Assoc. and the College of Engineering during Homecoming.

Prazak, director of Analog Front End Products for Texas Instruments in Tucson, received the Sidney S. Woods Alumni Service Award. This award is given to an alum who has demonstrated unwavering interest in and

loyalty to UA.

Prazak has worked with UA on strengthening its relationship with TI and has helped establish the Analog Design Contest for senior projects. He also has been involved in the senior capstone design program and works with the Infinity Project, a program that is designed to attract students to engineering.

He's also part of Connection One, an NSF/UA cooperative research center and is working with Electrical Engineering faculty on the world's first HD radio on a single chip.

Haynes is the corporate director for technical alliances at Northrup Grumman Space Technologies.

He received the Distinguished Citizen Award that recognizes distinguished service to non-profit organizations or outstanding volunteer service.

Haynes has teamed with his employer to establish the Los Hermanos, Northrup Grumman Corp. Engineering Scholarship, which

provides funding to a Nogales High School student for studying engineering at UA.

Haynes also is active with MESA, the minority engineering program; The American Society of Engineering Education; and the American Indian Science and Engineering Society.

In addition, he serves on the advisory councils of UA Engineering and UA Optical Sciences.



Paul Prazak



Ray Haynes

Student Projects



Jill Craven

Engineering students “contact wash” large parabolic mirrors at the Arizona Public Service all-solar electric generating station in Red Rock, Ariz.

Students say: Wash solar collectors, but look out for dust storms

A group of engineering students worked with Arizona Public Service Co. to improve the efficiency of a solar power plant in Red Rock, Ariz.

As part of their senior project, the students looked for the best way to clean the plant’s large reflector troughs that would produce the greatest increase in energy production at the minimum cost.

Like everything in the desert, the plant’s reflector mirrors gather dust, which lowers their efficiency and

energy production.

The students used sponges to scrub one set of troughs with deionized water and then removed excess water with squeegees for a “contact wash.” Another set of troughs was sprayed with deionized water but not scrubbed or dried for the “deluge wash.”

The students found that the plant would have to run for 720 hours at its higher efficiency to pay for the deluge wash and 1,400 hours for the contact wash.

The day after the student team finished cleaning the mirrors, a dust storm covered their work with a fine layer of dust, which led to another recommendation: clean the mirrors during the winter months when dust storms aren’t common.

The Chemical Engineering seniors involved in the project were Jill Craven, Jessica Bawden, Jason Kim, and Devin Wiley.

•
More info: Solar Collectors

Scrap metal brings music to students’ ears

A musical instrument made from discarded fire extinguishers proved to be one of the most popular exhibits at this year’s Engineering Design Day, an event that showcases projects designed and built by engineering students during the school year.

Few people could pass the instrument’s five fire extinguishers without tapping at least one of them to hear the eerie shift in pitch that occurred when they released a foot pedal and lowered the extinguisher into a bucket of water.

Most of the projects at Design Day come from senior design classes, but this musical instrument, called “Extinguished Oasis,” was built for an experimental class that brought together students from engineering, music and architecture.

Eighteen students built four instruments for the class, but Extinguished Oasis was the only one displayed at Design Day.

Regina Reed, an Aerospace Engineering student and one of the five students who built the instrument, explained that the group salvaged empty fire extinguisher canisters, cut them into different scoop shapes and suspended them over buckets of water with cables hooked to foot pedals. The canisters ring when they’re struck with rubber mallets.

The difference in density between air and water causes the canisters to vibrate at different frequencies as they’re lowered into the water.

Other teams built “Zarp”, a harp-like instrument; the “Fire Escape”, a set of tuned tanks and fire extinguishers; and the “Happy Accident Perpetual Pool-side”, a xylophone-like instrument made from a stainless steel pool filter and an oxygen tank. The teams played the instruments in a concert at the end of the semester.

The class, “Making Musical Instruments Out of Scrap Metal,” was



Ed Stiles

Aerospace Engineering Junior Regina Reed demonstrated the Extinguished Oasis musical instrument at Engineering Design Day.

created by Gary Cook, professor of music; Dale Clifford, assistant professor of architecture; and Jeff Goldberg, associate dean of engineering.

Extinguished Oasis was built by aerospace engineering junior Regina Reed, architecture graduate student Matt Gindlesparger, environmental hydrology junior Lisa Wade, mechanical engineering master’s student Dan Alfred, and computer engineering senior Tyler Coles.

•
More info: Extinguished Oasis



The award winners and representatives from UA at TMAL included (from left) **John Buttery**, Eller College Distinguished Service Award; **Paul Portney**, dean of the Eller College of Management; **Tom Peterson**, dean of UA Engineering; **Gregory Boyce**, College of Engineering Distinguished

Service Award; **Christopher McGuire**, Eller College Lifetime Achievement Award; **Hector de J. Ruiz**, 2007 Technology Executive of the Year; UA President **Robert Shelton**; and **Don Dillon**, College of Engineering Lifetime Achievement Award.

Ed Stiles

Ninth annual TMAL further links UA with Phoenix

UA's 9th annual Technology & Management Awards Luncheon (TMAL) was held in October at the Phoenician Resort and Spa in Scottsdale, Ariz. The event honored five people who have made significant contributions to the economic well-being of the nation and whose careers exemplify the critical melding of technological expertise with business skills and entrepreneurship.

Hector de J. Ruiz, chairman and CEO of Advanced Micro Devices Inc., was honored as the 2007 Technology Executive of the Year.

Ruiz's experience includes 22 years with Motorola's semiconductor products sector and work in research and manufacturing operations for Texas Instruments.

The other 2007 TMAL honorees for service and lifetime achievement include Gregory H. Boyce, president and CEO of Peabody Energy; John Buttery, founder of BLR Data; Don Dillon, founder of CMX; and Christopher McGuire, vice president and director of the H.N. and Frances C. Berger Foundation of Palm Desert.

Shelton lauds awardees

UA President Robert Shelton, Paul Portney, dean of the Eller College, and Tom Peterson, dean of the College of Engineering, presented the awards.

President Shelton noted that the honorees have had success in

- Developing new products.
- Launching companies.
- Building markets and industries.
- Leading mergers and acquisitions.

Shelton said they also have given back to boards, non-profit endeavors and universities.

"Through their leadership of technology-based companies and entrepreneurial ventures, the individuals we honor today have made significant contributions to the nation's economy — an accomplishment we applaud at The University of Arizona," he said.

TMAL links UA to Phoenix

Shelton said TMAL takes place in Phoenix and not in Tucson because it is part of UA's increasing presence in the Valley of the Sun.

"Last year we opened The University of Arizona College of Medicine-Phoenix, in partnership with Arizona State University," Shelton said. "This year our first class — 24 medical students strong — is making history by receiving their entire medical training in downtown Phoenix."

Last year, the Eller College of Management brought its Executive MBA program to Phoenix and recently opened the doors of its new permanent home in the Valley — the

Scottsdale campus of the Eller College of Management.

"We are pleased to serve the millions of people in this fast-growing metropolitan area," Shelton said. "As Arizona's land grant university, we are committed to the economic development of the entire state, to the business leadership, and to the business leaders of tomorrow as we prepare them to lead the state of Arizona into the future."

University degree opens doors

UA is a place of possibility, Portney added. For many, UA represents an accessible path to an ambitious goal.

Portney noted that one of the TMAL recipients was a Nogales high school graduate whose UA degree helped him go on to be an executive in an aerospace company. Another, a Bisbee High School graduate, now is CEO of one of the world's largest engineering construction firms.

"A university degree is an enabler for its recipients," Peterson added. "It opens doors."

"The award recipients we recognize today have used their preparation in engineering and management not only for the betterment of their own personal careers, but for the clear and demonstrable benefit of society as a whole" Peterson said.

Philanthropy

Scholarships

Brown Foundation supports National Merit Scholars

Students supported by Thomas R. Brown Distinguished Scholarships attended an annual luncheon in October that brings the scholarship recipients together with the Thomas R. Brown Family Foundation Board.

The College of Engineering uses the scholarships to attract National Merit Scholars to UA.

The scholarships, first funded in 2002, were permanently funded through a \$1 million endowment gift in 2005 and now total \$2 million.



Thomas R. Brown Family Foundation board members (front row) met with students at a luncheon to celebrate the foundation's support of scholarships in the College of Engineering and the Eller College of Management. The Brown Scholars in engineering are standing in the back row along with Engineering College Dean Tom Peterson.

Ed Stiles

Endowments

Continued from Page 1

Smallhouse announced the \$4 million endowment gift at an annual luncheon that celebrates the Brown Foundation's ongoing support of student scholarships in Engineering and the Eller College.

The new endowments will fund, in perpetuity, two faculty chairs that the foundation has funded until now through annual gifts.

Strong Support for Many Years

"For many years, the Brown Foundation has made a strong investment in The University of Arizona," UA President Robert N. Shelton said. "It's vital that we increase our number of endowed professorships and scholarships, and I'm thrilled that the Brown Foundation is enabling the university to invest in great people."

Currently, Professor Amar Gupta holds the Thomas R. Brown Chair at the Eller College and Linda Powers, a professor of Electrical and Computer Engineering, holds the Thomas R. Brown Chair at the College of Engineering.

Gupta has led the creation of dual degree programs that offer students the opportunity to concurrently earn an MBA with a master's degree from either the College of Engineering, College of Science or College of Opti-



Sarah Brown Smallhouse talks with a student following the announcement of the faculty chair endowment gifts.

Ed Stiles

cal Sciences.

Powers, an expert in the field of bioengineering, has been collaborating with BIO5 researchers at UA, and has founded her own company. The BIO5 Institute brings together researchers from agriculture, medicine, pharmacy, basic science and engineering to fuel economic development by pursuing state-of-the-art biological research.

Professors Play Key Role

"A couple of years ago, we fully endowed the Tom Brown student

scholarships," Smallhouse said. "More recently, we talked about the role of professors.

"Our Foundation believes that the role that professors play in the lives of students and, ultimately to the future, cannot be over emphasized. Professors provide leadership, serve as mentors and role models, provide inspiration, and are trusted confidants as students look for career guidance."

"University faculty are an absolutely essential part of fostering technology and management, and the trustees are proud to announce that today we endow these two chaired professorships in perpetuity," Smallhouse announced to the students, faculty, administrators and foundation trustees gathered at the scholarship luncheon.

"This is an exciting moment for us, as we give the largest gift the Brown Foundation has ever made," she added.

Engineering Dean Tom Peterson said, "We've been extremely fortunate to have this relationship with the Brown family and the Brown Family Foundation for a number of years. This relationship has clearly gone beyond financial support of our programs to a true friendship and collaborative interaction."

The endowments will be managed by the UA Foundation.

•
More info: Thomas R. Brown

Valued partner

Phelps Dodge boosts curriculum, research

Engineering College representatives and mining executives met in May to celebrate the \$2.5 million Douglas C. Yearley Phelps Dodge Chair in Mineral Processing.

The event also introduced Phelps Dodge executives to Assistant Professor Jinhong Zhang, a Mining and Geological Engineering (MGE) faculty member who is the first person to hold the Yearley-Phelps Dodge Chair.

Although the chair is named for Phelps Dodge, the company was recently acquired by Freeport-McMoRan Copper & Gold, Inc.

In addition to the Yearley-Phelps Dodge Chair, the company funds the Leonard R. Judd Scholarship program, which provides about \$64,000 annually to students in mineral resources-related majors. These students also receive paid summer internships as part of the scholarship package.

The Yearley-Phelps Dodge chair continues the UA/Phelps Dodge



Speakers at the celebration dinner for the Douglas C. Yearley Phelps Dodge Chair in Mineral Processing were (from left) Tom Peterson, dean of UA Engineering; Mary Poulton, department head in Mining and Geological Engineering; Assistant Professor Jinhong Zhang, who currently holds the Yearley-Phelps Dodge Chair; and Tim Snider, president and chief operating officer of Freeport-McMoRan Copper & Gold Inc., which recently acquired Phelps Dodge Corp.

Ed Stiles

partnership that stretches back to UA's founding in 1885, said Tom Peterson, dean of engineering.

Peterson introduced Tim Snider, who was with Phelps Dodge and now serves Freeport-McMoRan as president and COO, as one of the key people who has helped to set the direction for UA's MGE program in recent years.

Snider also presented the book *Vision and Enterprise*, the company's history, to Zhang at the dinner.

Zhang said he plans to use his position in the Yearley-Phelps Dodge Chair to offer several courses in mineral processing chemistry and flotation chemistry.

•
More info: Phelps Dodge



Industry Advisory Council members posed for a photo during the group's September meeting.

Tom Peterson

IAC learns about projects and college progress

The College of Engineering Industry Advisory Council gathered on the UA campus for its semi-annual meeting in September.

The group consists of representatives from industry, business, government and academia who have an interest in the success of UA Engineering.

The group members advise college administrators, act as liaisons between

the college, government and industry, and serve as advocates for the college.

During their meeting, they heard a state-of-the-college message, had a dialog with UA President Robert Shelton, were given research presentations by several faculty members, and learned about various developments in the college. In the evening, they attended the UA football game.

Scholarship honors Aileen Primero

TransCore and the family and friends of Aileen Primero have established a scholarship in Engineering Management in her honor.

Primero, a 22-year-old Engineering Management senior and TransCore employee, died in a traffic accident in July.

Special preference will be given to applicants who have demonstrated an interest in traffic systems.

TransCore is the world's largest manufacturer of transportation-based RFID systems used in areas such as electronic toll collection; traffic management; rail, truck, container, barge and intermodal tracking and monitoring; homeland security border control; airport ground transportation; parking; and secure vehicle access control.

Support and Awards

ASCE scholarship

The Southern Arizona Branch of the Arizona Society of Civil Engineers has established an endowment fund to provide scholarships for undergraduates who are working toward degrees in the UA Civil Engineering and Engineering Mechanics Department.

The scholarships may be awarded to students entering the department, as well as those already enrolled. In the case of students who are already in the program, they must be active members of the UA student chapter of the American Society of Civil Engineers.

Candidates will be nominated by the department and the scholarship committee of ASCE's Southern Arizona Branch will review the candidates and recommend scholarship winners.



M.J. Dillard (left), past president of the Southern Arizona Branch of the Arizona Society of Civil Engineers, and **Randall D. Harris**, president of the organization, accept a certificate recognizing the group's endowment gift to UA Civil Engineering. Presenting the award is **Juan Valdés** (center) head of the UA Civil Engineering and Engineering Mechanics Department.

Ed Stiles



Tom Peterson (center), dean of UA Engineering, accepts a check from Lockheed Martin that will fund Engineering Design Day 2008. Presenting the check are **Steve Lasswell** (left), Lockheed Martin's university executive, and **Art McAnarney**, Lockheed Martin campus relations manager.

Ed Stiles

Lockheed Martin funds 2008 Engineering Design Day

Lockheed Martin, which has been the primary sponsor of Engineering Design Day for the past several years, will fund the event again in 2008.

At the end of each spring semester, Design Day showcases engineering projects that have been designed and built for senior design classes in various engineering departments and for a multidisciplinary senior design course. Other projects are constructed by engineering clubs.

While Lockheed Martin is the primary sponsor, other companies sponsor projects and awards for the event. Last May, students won a total of \$13,500 in 18 award categories during the event.

Some Design Day projects are commercialized. Others provide important experimental data for project sponsors.

For more on Engineering Design Day, see Page 3.

UA center wins UNESCO prize for arid zone hydrology Work

UA's SAHRA Center is one of two institutions that have won the 2007 International Great Man-made River Prize, which is awarded every other year by UNESCO, the United Nations Education, Science, and Culture Organization.

SAHRA (the NSF Science and Technology Center for Sustainability of Semi-arid Hydrology and Riparian Areas) is headquartered at UA and includes several partner institutions, including universities, government agencies and national laboratories.

SAHRA is a joint winner of the prize with the Center for Hydrometeorology and Remote Sensing (CHRS) at U.C. Irvine.

SAHRA Director Jim Shuttleworth accepted the prize for SAHRA, and CHRS Director Soroosh Sorooshian accepted the prize on behalf of CHRS at a ceremony in Budapest Hungary.

"The unusual name of the award



Jim Shuttleworth

Courtesy of Jim Shuttleworth

is out of respect for the Great Man-Made River, a huge network of wells and pipes in the Sahara Desert that supplies water to the cities of North Africa," Shuttleworth said.

"The award has been awarded to everyone involved in the SAHRA Center and reflects our numerous contributions to the hydrology of semi-arid and arid regions of the world and the level of international respect for the work we do," Shuttleworth said.

•
More info: SAHRA

Philanthropy

The UA College of Engineering is fortunate to have many companies, organizations and individuals who enthusiastically support its research and education mission.

Here is the list of those who have contributed to UA Engineering during Fiscal Year 2006-2007.

Their support is vital. Without this help, some students would not be able to complete their educations. Many others would not have access to resources that give UA Engineering a margin of excellence in educating tomorrow's engineers.

Similarly, the research effort in the college, which directly supports the economies of Arizona and the nation, would not be as strong nor as diverse without this continued support.

We want to take this opportunity to say, "Thank You!" from the students and faculty who have benefited from the generosity of those listed on these pages.

We have made every effort to list all those who contributed to the college and sincerely apologize if anyone has been left off the list.

If you donated to UA Engineering during 2006-2007 and don't see your name, please let us know and we will recognize you in the next issue of *Arizona Engineer*.



Matt Bralley

Members of the da Vinci Circle, the College of Engineering giving society, recently visited the AZ-LIVE lab, where they donned virtual reality goggles, traveled inside the human heart, walked through a DNA helix and experienced other virtual environments. AZ-LIVE is a room where university researchers, faculty, and students are immersed in a computer-generated world. The environment combines 3-D computer graphics, stereoscopic projection technology, acoustical tracking devices, and four-channel audio, creating an illusion of reality. The da Vinci Circle program includes a Renaissance-like combination of ongoing seminars, lectures, excursions, tours and other activities reserved exclusively for da Vinci Circle members.

\$100,000 OR MORE

ASM America, Inc.
Arizona Public Service Foundation
Thomas R. Brown Family Foundation
The Merwyn C. Gill Foundation
Intel Corp.
Raymond & Jean Ogleshorpe
Salt River Project

\$50,000 to \$99,999

Applied Materials
Newmont Gold Co.
Phelps Dodge Foundation
Raytheon Co.

\$40,000 to \$49,999

Analog Devices, Inc.
Arizona Mine & Mill Equipment
The Denver Foundation
Honeywell International
Intel Foundation
John Toomey
Burgess & Patricia Winter

\$20,000 to \$39,999

Arizona Power Authority
IBM Corp.
Information Storage
Hewlett-Packard Co.
Lockheed Martin
Mitsubishi Electronics America
Peabody Investments Corp.
Martha Prince
Random Network
Texas Instruments Tucson
Jack & Linda Thompson
U.S. Gypsum Co.

\$10,000 to \$19,999

Arizona Society of Civil Engineers (AZSCE)
BAE Systems
Therese Berg
Boeing Co.
Estate of Harold J. Bonnevie
Exxon Mobil Corp.
Joseph Gervasio
Helmut & Ellen Hof
Honeywell, Inc.
IBM Corp.
Max Morgan
Genevieve Morrill
Nabih Youssef & Assoc.
Northrop Grumman Space Tech.
Ricoh Innovations Inc.
Brice W. Schuller
Lenise & Alan Smith
Southern Arizona Branch of the Arizona Society of Civil Engineers
SRC Education Alliance
Tidewater, Inc.

\$5,000 to \$9,999

Mildred Bly
Boeing Co. Matching Gifts
Copper Club Educational Fund, Inc.
Wayne & Carol Dawson
Richard & Carol De Schutter
Edmund Industrial Optics
Environmental Systems Products
Fidelity Charitable Gift Fund
Fluor Corp.
Fujitsu Limited
GEOST

Leston & Thelma Goodding
Roger & Jeri Harwell
Iota Engineering
Veikko & Elizabeth Kanto
Alan & Lois Kehlet
KLA Tencor Foundation
Agnes Matsch
Ernest & Sally Micek
Microsoft Corp.
William & Dianne Nelson
Phelps Dodge Corp.
Ridgetop Group Inc.
Rio Tinto Services Limited
Seventh Rank Associates
Shell Oil Co. Foundation
Siemens Corp. Research, Inc.
Marjorie M. Thomas
Vestar Development II., L.L.C.

\$1,000 to \$4,999

David & Dede Areghini
Association for Unmanned Vehicles
ATLAS Copco CMT USA
Ayco Charitable Foundation
Az Chapter-American Concrete Institute
Baybridge Dental Clinic
John & Karen Belt
Edwin & Joan Biggers
Kenneth & Victoria Boyd
Herbert & Sylvia Burton
California Community Foundation
Robert Campbell
Castro Engineering Corp.
Caterpillar Foundation
CH2M Hill Companies

Philanthropy

Cleveland-Cliffs Foundation
ConocoPhillips
Lindy Coté & Thomas Owen
Dataforth Corp.
William & Margaret Davenport
Jake & Beverly Doss
Jay & Helen Dotson
William & Ella Dresher
Karl & Sandy Elers
Emerald Coast Chapter, AUVSI
Howard & Laurie Enloe
ExxonMobil Foundation
Sidney Franklin
General Electric Foundation
Jeffrey & Donna Goldberg
Richard Guthrie & Patricia
Dunford
David Hall
Jason Hand
Ray Haynes
Marguerite Hesketh
Virginia & Lawrence
Hjalmarson
Hofmann Family Foundation
Paul Hom
Institute of Industrial Engineers
Joy Mining Machinery
Michael & Robin Kaiserman
Katharine Kent
Kiewit Western Co.
Norbert & Emilie Kulh
Jingquan Li
M3 Engineering & Technology
John & La Donna Marietti
Sara McCoy
S. Jack McDuff
Thomas & Lorene McGovern
William & Dianne Mensch
John Wesley Miller Companies
Ralph Miller
Larry Milner
Morrison Maierle, Inc.
National Coal
Transportation Association
The New Nose Co.
Thomas & Margaret O'Neil
P and H Mining Equipment
Mark & Gerry Palmer
Jeffrey Patterson
Thomas & Shannon Peterson
Joan Pracy
John & Elke Reagan
William Rihs
Rocky Mountain Coal
Mining Institute
Vieno Rukkila
James & Dee Ann Sakrison
Sandvik Mining and Construction
USA and Canada
Ernest & Joanne Smerdon
Society for Mining Metallurgy
and Exploration, Inc.
Southwest Gas Corp.
William & Elizabeth Staples
Robert Suarez
Margaret Taylor
Marjorie A. Thomas

Belle Tom
Tucson Vascular Surgery
Anatoli & Alla Tumin
Donald Uhlmann
Eugenie Uhlmann
Vanguard Charitable
Endowment
Robert & Sue Vaughan
Veeco Tucson, Inc.
Ventana Medical Systems
The Wachovia Foundation
Ann Wilkey
Williams Companies Foundation
Xilinx, Inc.

\$500 to \$999

Sargent Controls & Aerospace
Barbara Schreur
Kok Kwai & Avis See-Tho
Shepard-Wesnitzer, Inc.
Steven Short & Mary Greer-Short
Timothy Smock
Southern Arizona Architects
The Stanley Group Ltd.
Ronald & Wanda Stiles
Structural Grace Inc.
Terry Trigg
United Way of Tucson & Southern Arizona
Wayne Wisdom

Up to \$500

Abbott Laboratories Fund
Kevin & Cindy Abreu
Andrea Acuna
June & Joseph Adams
Pawan & Nilima Agrawal
Iftekhar Ahmed
Kenneth & Carolyn Ahmie
Alan Aikens
Klaus Albertin
John & Paula Alden
John Alexander
All Star Heating & Air Conditioning
David & Gay Allais
J. Mel & Phyllis Allen
Mitchell Gregg Allen
Roger Allen
Raymond Allis
Thomas Allred
Charles Almestad
Randy & Barbara Alstadt
Larry Altuna
Amenities & Misfortunes Fund
David & Madeline Ammann
Peter & Patricia Amundsen
Carl Anderson
Darcy Anderson
Richard Anderson
Robert & Patricia Anderson
James Angel
Chris Angleman
Mony Antoun
Beatrice Arch
James & Deborah Armbrust
Felix Armendariz
Brian Arnold
David Aros
John & Sherrie Ashcraft
ATK Alliant Techsystems
Brian Aviles
Raymond Avina
Shayne Aytes
Charles & Judith Backus
Kwang Baek
Frederick Bakarich
Jonathan & Mary Baker
Victor & Pauline Baker
Craig & Janet Baldon
Angela Balliet
Keith Ballou
Cedric Balozian
James Banfield
Frank Bantlin
Tracy Barclay
Kim & Carolyn Bargerone
Brett Barnett
Lyndon Barnett

Edward Barrios
Richard & Georgia Bartholomew
Elizabeth Bauer & Peter Brown
Eleanor Bauwens
Martha Beaver
Joseph & Inga Beavers
Bechtel Foundation
James & Trudy Bedessem
William & Sharon Beecroft
William Bennett
John & Yolanda Bernal
Joslyn & Michael Bernhardt
Alan Berry
Andrew Berson
Robert Best
Rosemarie & Kenneth Betzen
Richard & Paula Beyak
Thomas Biss
John Bissell
Thomas & Anh Blackwell
James & Jeanne Blair
David Blanchard
Douglas Blanchard
Stephen & Natalie Blecher
Brent Blevins
William & Elizabeth Blohm
Randall & Donna Blondeau
David & Diane Bloodworth
James & Margaret Bly
Raymond A. Bobbitt
Roland Boehne
Stephen & Kathleen Boerigter
Craig & Nanette Bohren
David Bolles
Billie Boone
Donald Booth
John & Sherilyn Boyer
John Brabson & Ellen McCullough-Brabson
Michael Bradley
Ted Brannan
Gerald & Pamela Brannon
Kathryn Brantingham
Robert Brauns
Janet Brelin-Fornari
Kenneth & Teresa Brice-Heames
Jeffrey Bridge
Johh Briedis
Jeanette & David Brinker
John Britton
Gene Broadman
David & Sheila Brod
Calvin Bromfield
Jerry & Evelyn Brooks
George & Diane Broome
Thomas Broughton
Barry & Shirley Brown
Francis Brown
Marshall & Cindy Brown
Jonathan & Marilyn Browne
Lawrence & Lori Bruskin
Jack Buchanan
David Buckley
David Bujak
Witcher & Peggy Burnett
Richard & Karen Burrows
David Buseck
Business Executives for National Security
Paul Buzas
Ken Byrne
Christopher Cafiero
Marilyn & Walter Calhoun
Charles & Ellen Camarillo
Eloise & Rocco Cambareri
Dyer & Sheila Campbell
Matthew Campisi
Nicholas & Dorothy Carnevale
Richard Carr
Thomas & Martha Carr
William & Marilyn Carr
Pauline & Steven Carter
Nancy Case
Peter Cerna
Jami Chaloupka
Dee-Dee Chandler
Frederick Channon
Natasha Checkovich
Carolyn Chen
Guangshun Chen
Nobel Chen
Mary & Robert Chesher
Shu-Chung Chiao
Iris Chipman
Po-Han & Kam Chung
Cisco Systems Foundation

Citigroup
Staphanie Clagg
David Clapp
Bradley & Edythe Clark
Chester Clarke
William Clarke
Mark Clements
William Clemons
Winston & Maria Clendennen
Eugene & Joan Cliff
Lynda Coffelt
Jeremy Cohn
Timothy Coker
Andrew & Julie Cole
Kendall Cole-Rae
Charles Coles
Cornell & Carole Collins
John & Sheila Collins
John & Virginia Colyer
Jason Contapay
Edward Conway
David Cooper
Donald Cooper
Gary Cooper
Louis Coraggio
Scott Coughlin
Theodore Cox & Patricia Ring
Rufus Crawford
Judith Creighton
Howard & Sarah Creswell
David & Elizabeth Crouthamel
R. Bruce Crow
Thomas Crow
Richard Crowell
W. Russell Cummings
Earl Cumming
Robert & Greta Cummings
Michelle Cunningham
Randolph Currin
Paul & Amanda Curro
DaimlerChrysler Corporation Fund
Peter Daly
Ashok Damera
Kirk Damron
Raj & Cynthia Daniel
Douglas & Elizabeth Darlington
James Davidson
John Davis
Kelly Davis
Robert & Susan Dawson
Dayton Foundation
Peter & Elsmarie De Mars
Richard & Etta Dean
Arthur Deardorff
Gary Degeronimo
David DeVenthal
Louis & Mary Demer
Johann Demmel
Kenneth & Betty Detweiler
Thomas & Suzanne Dew
Michael Dezimmer
Alfred Diehl
Matthew Diethelm
Kenneth Dobbs
Richard Dobs
Diana Dohmen
John Dolegowski
Stephen & Peggy Doncov
Claris & Betty Donelson
Qiping Dong
Ruben & Barbara Donnadiue
Tanya Donohue
James Douthit
Rand & Barbara Drake
Lawrence Dreyer
Samuel & Leanne Dukes
Mark Durham
James Dutton
Edison International
Peter Edsall
John Edwards
Larry & Mary Edwards
Ren Egawa
Kevin & Vicki Ehlers
Mark Ehlers
Mohammad Ehsani
Lynne Egler
Melinda & Jules Ellingboe
Employees Charity Organization
M. Stephen Enders
Paul Englehart
Stephen English
Eric & Kristen Ennis
Bryn Enright

Philanthropy

Frank Ensign
 Entergy Services Corp.
 John Erlick
 James & Harriett Erwin
 William Escapule
 Thomas & Rose Ewing
 Jan Falkenhagen
 Michael Farinech
 Hermann Fasel
 Faulkner Engineering Services
 Frederick Felix
 Michael Ferguson
 Marianne Fernandez
 Robert Feugate
 Dan Fieldman
 Stephen & Ruth Fienhold
 Thomas Filar
 Barbara & Frank Filas
 Randall Fink
 Mark & Sheila Fleming
 William Flewelling
 Robert Flori
 James & Deborah Foerstner
 Ka Fogg
 Warren & Christine Folkerts
 Randall & Margaret Foote
 Ralph & Melanie Ford
 Christopher Foster
 Charles & Kim Frankenberger
 James & Mary Franklin
 Joseph & Patricia Franea
 George & Greta Frazier
 William Freely
 Catherine Freeman
 George Freshwaters
 John & Marilyn Fries
 Matthew Frondorf
 Marino Fuentes
 Lisa Fuller
 Dale Funk
 Michael Gammino
 Visvanathan Ganapathy
 Douglas Gapp
 Margaret Garcia
 Rudolph Garcia
 Paul & Wallay Gardanier
 Richard & Ruth Garland
 Josef & Grace Gartner
 Joseph & Constance Gates
 Teresa Gerard
 Robert Giacomazza
 Bryce & Brenda Gibson
 George & Josephine Gibson
 Adam Gilbert
 Wayne Gilles
 Charles Gillespie & Nancy Peterson-Gillespie
 Edward & Beth Gladly
 Steven Glickman
 Jeffrey Glover
 John Goedert
 Eric & Ellen Goldin
 Howard & Sheila Goldstein
 Edward Gouvier
 Shaun Graber
 Clayton & Annette Grantham
 Vicki Gray
 Jeffrey Green
 Michael & Maribeth Greenslade
 Paul Greer
 John & Marcia Grenier
 Larry & Judy Griffin
 Martin & JoAnn Gronberg
 Elmer & Laurel Grubbs
 Joyce & Gene Grush
 Barbara & David Guarino
 Edgar & Janet Guenther
 Kenneth & Pamela Guenzi
 Guidant Foundation
 Roderic & Kimberley Guptill
 Henri Guyader
 Ronald & Patti Guymon
 Chikonga Gwaba
 Christopher Gypton
 Tom & Lisa Hacker
 David Hackman & Marla Motove
 John Haebler
 Gary Hagedon
 Halliburton Co.
 Roy Hamil
 Edward Hamilton
 Kenneth Hamm
 David & Genie Hammel
 Paul & Holly Hand

James & Merry Hansen
 Roy & Martha Hansen
 Steve Hardash
 Calvin Hardcastle
 James Harper
 Richard & Janice Harper
 Kenneth & Carolyn Harpole
 Darrel & Sandy Harriman
 Larry & Maytie Harrington
 Andy Harris
 Mark Harris
 Peter & Martha Hart
 Barret Hartman
 Kenneth & Margaret Hartwein
 James & Shirley Harvey
 Clark & Pamela Hay
 George & Elizabeth Hayes
 John Hector
 Richard Hector
 Barbara Heefner
 George Hefner
 Donald & Lynn Heidenreich
 Jeffery Heidler
 Ralph & Ann Heinze
 Gary & Linda Hemphill
 William & Mary Henry
 Robert Herman
 Lorenzo Hernandez
 Mandy Herner
 Michael Herrick
 Walter Higgins
 Michael & Jeanine Hill
 Joanne Hilton
 William Hirt
 Philip & Christine Hodder
 Harry Hodges
 Patrick & Susan Holden
 Donald & Yolanda Hom
 Bei Hong
 Cecil Honnas
 Tommy Hooten
 Ramon Hopkins
 David Hormby
 John Horwath
 Wanda & Herbert Hotchkiss
 Kirk Howe
 Vic & Kimberly Hsiao
 Paul Hsieh
 Rick Huang
 Pete & Marjorie Hudson
 Stephen Huggard
 Robert & Patricia Hughes
 John Huleatt
 Peter Hushek
 Adam Hutchinson
 Richard & Dolly Ickler
 Gordon & Jennifer Ingmire
 Charles Ingram
 Michael Ingram
 Bette Ingwer
 Leslie & Janet Isaacs
 Ivan Labs, Inc.
 Ronald & Sally Jachowski
 Gary & Melissa Jackson
 John & Caroline Jamba
 James Davey & Assoc., Inc.
 William Jensen
 Brian Jepperson
 Rudolf Jimenez
 Adelard Jodoin
 Paul John
 Perry & Jamie John
 Ronald Johnson
 Judith Johnson
 Mary Johnson
 Ron Johnson
 Anthony Jones
 J. W. Jones
 William & Betty Jungen
 Laura & Jonathan Kagle
 Laveen & A. Raclare Kanal
 Arik & Mara Kashper
 Ronald & Carol Kasulaitis
 Kenneth Katsma
 Ifyenia Kececioglu
 John & Pamela Keffer
 William Kemp
 Bernard Kenny
 Peter Kerwin
 John Kilps
 Michael King
 Robert & Carol King
 Rockwell King
 Sally & Lawton Kizer



Matt Brailey

Each spring semester the College of Engineering sponsors a Scholarship Donor Appreciation Reception to honor individuals and companies who contribute scholarships to UA engineering students. The donors who attended the 2007 event posed for this photo outside the Arizona Inn. Donors' generosity provides financial aid for some students who otherwise could not afford a college education. The scholarships free other students from part-time jobs so they can devote more time to school and career enrichment activities. The scholarships also are a valuable recruiting tool that help UA Engineering compete for the best students coming out of high school.

Michael Kleinrock
 Lucien & Joyce Klejbuk
 Barbara Ann Klenzin
 Peter Knaggs
 Joshua Knepper
 John Knoke
 Eric & Chris Koglin
 Alicia Kohner
 Arvin Kolz
 Gregory Konicke
 John Kopydowski
 Keith & Susan Kotchou
 Jerome & Geraldine Koupal
 Robert & Leslie Kowalski
 Frederick & Frances Krause
 Christof Krautschik
 John Kristofetz
 Emily Kubovchik
 Abhijit Kudrimoti
 Patrick Kuhne
 Willis & Evelyn Kulp
 James & Margaret Kurbat
 Richard & Nancy Kurbat
 R. Scott & Dawn Kurbat
 John La Bar
 John Laborde
 Alvaro & Christine Laguna
 Bruce Lahti
 Lam Research Corp. Foundation
 Edward & Lynda Lamson
 Leon Lancaster
 Anthony Langer
 William & Carolyn Laray
 David LaRoche
 Carl Larson
 Robert Latham
 Wallace Latimer
 Michael Lawrence
 Patrick & Carolyn Lawrence
 Miodrag & Alyce Lazarevich
 Charlene Ledet
 Eric Ledet
 Bob & Virginia Lee
 Daniel & Yuri Lee
 Franklin Lee
 Sheri Lee
 Diana Lefler
 Brenda & Scott Lehan
 Jay Lehr
 Christopher Lezczycki
 Bradley Leonard
 Chris & Jeannine Leverenz
 Francis Leyva
 Guangming Li
 Thomas & Palma Liebert
 Yeow & Wei Lim
 Lori & Joel Lindahl
 John & Jane Linkswiler
 Jane & Ian Linton

James LoCascio
 Derek Logan
 Scott & Christine Logan
 Peter Knaggs
 Melissa Lopez
 Jessica Loring & Laurence Rasmussen
 Gregory & Elizabeth Lorton
 William & Alice Loveless
 Peter & Caroline Lozano
 Zhiming Lu
 John Lucy
 Richard Luckemeier
 Craig Ludtke
 Thomas & Ann Lundquist
 Robert & Sandra Lutz
 Forest Lyford
 Charles Lynch
 John Lyon
 Gary & Joyce Lytle
 Willis & Evelyn Lytle
 Paula & John Macek
 Michael & Maura Mackowski
 Avishkar Madar
 James & Andrea Malmberg
 Anthony Marino
 James Marr
 Vincent Marra & Ann Lehner-Marra
 Alan Marshak
 Robert & Dolores Martin
 David & Patricia Martinez
 Stacey Martinez
 Ellis & Sheila Mascareno
 George & Emily Masech
 Thomas Mashaw
 Richard & Flo Ellen Maslow
 Michael Massaro
 Stephen Masser
 Kevin Matherson
 Mathieu Engineering Corp.
 Larry Matthews
 Richard Mauntel
 Kathy & William Maynard
 Daniel McBride
 Samuel & Wilhelmnam McCandless
 Dennis McCarthy & Deborah Fleming
 Travis McCarthy
 John McCormick
 Walter & Sharon McDonald
 David McDonnell
 Krista McEuen
 Jack McFarland
 Anastasia & George McInnis
 Ryan McIntyre
 Dennis McKeen
 Patrick & Amy McKenty
 Kim & James McKenzie

Bruce McLaren
 Dennis McLaughlin
 Clyde McLennan
 Brian McMorrow
 Jeremiah McNeil
 Chad McRae
 P.K. Medhi
 The Medtronic Foundation
 Patricia Mehrhoff & Robert Nelson
 Terry Meier
 Wellington Meier
 Barry Meisels
 Thomas & Kathleen Meixner
 Ruben Mendoza
 Mentor Graphics Foundation
 Gwen Mercer
 Michael Messina
 Charles Micka
 Richard Milakovich
 William & Pamela Milam
 Diana Miles
 Coleman Miller
 Elroy Miller
 Mary Bly Miller
 Robert Miller
 William Miller
 Ben Mills
 Eric Mills
 Kathryn Mills
 W. Carlisle Mills
 Mary Minke
 Mel & Beverly Mitchell
 William Mitchell
 MMLA-PSOMAS
 David Mobley
 Carl & Yvonne Mohrbacher
 Mehran & Shahla Mokhtarian
 Mark & Kelly Mollison
 Christopher Mone
 Michael & Catherine Monsegur
 Philip & Nancy Monzon
 David & Magdalena Mooberry
 Theodore Moon & Youngok Jin
 Richard & Nancy Moore
 Thomas Moore
 Maria Moreno
 Olga Moreno-Urquiza & Mark Siemens
 Henry & Suzanne Morgen
 James Moser
 Mary Moss & Gorden Moses
 Amir Motamedi
 Lynette Moughton
 Joseph Mulligan
 James & Nancy Mullins
 Chris Mundy
 David Murphy
 Donna & Willis Murphy
 Sean & Ann Murphy

Philanthropy

Dorcas Muzumara
 Jack Myers
 Michael & Susan Nativi
 Carlos Navarrette
 William & Anne Neblett
 James & Georgia Needham
 David Nelsen & Katherine Keith
 Ingrid Nelson
 James Nelson
 Michael & Cynthia Nelson
 W. Sig & Rosamond Nelson
 Shlomo & Yael Neuman
 Dennis Neumann
 Newmont Mining Corp.
 Charles Nicholson
 Grady Nicholson
 Margaret Norem & Nancy Kurbat
 Nancy Norem
 Edward & Patricia Nowatzki
 Mary & Richard Obee
 Paul Ocansey
 Anthony Ochoa
 Paul Ochs
 Scott O'Connell
 Kerry O'Connor
 Charles & Peggy Oden
 Joe Omojola
 Kevin Opalka
 Uriah & Janice Orr
 Charlotte Ort
 Andrew Osbrink
 Marlyn & Chris Osterman
 Martin & Carol O'Sullivan
 Gerald Owens
 Lloyd Packer
 Joe Padias
 Scott Page
 Steven Pageau
 Joseph & Sandra Palais
 Dorothy & Mark Palmer
 Parwathi V. Paniker
 Vicente Panizo
 Dave & Vivienne Parizek
 Trevor Park
 Jon Parsons
 Thomas & Rosalinda Partel
 John Pass
 Allan Patch
 William Patient
 Felice Patrick
 John C. Patterson
 John W. Patterson
 Bruce Patty
 Keith Pedersen
 Robert Peters
 Donald Pelley
 PepsiCo Foundation
 Juan Peredo Villarreal
 Henry Perkins
 Wallace Perkins
 Robert & Margaret Perry
 Peter D Motorsports, Inc.
 L. Rolf Peterson
 Warren Phelan
 Thomas Phielix
 Philips Electronics
 Phoenix School of Law
 Paul & Linda Pickard
 Ryan Pine
 Ernest Planck
 Raymond & Donna Plock
 Matthew Ploor
 PNM Foundation
 John & Jan Podlesny
 Alexis & Michael Popovich
 Mark Poppe
 Calvin Porcher
 Richard Potter
 PPG Industries Foundation
 John Prator
 Praxair Matching Grants
 Robert & Katherine Preble
 Ricardo Preciado
 Edward & Diane Preston
 Ruth Pullen-Soklow
 Sara & Nagubandi Pundari
 Bonnie Punske
 Kenneth Putnam
 R.S. Bell & Sons Concrete
 David & Christine Raasch
 David Rabb
 Susan Rakow-Anderson
 & Mark Anderson
 Susan & Charles Ramsey

Rancho Pauma Granite
 Peggy Randolph
 Peter Rau
 Richard Ray
 Burt Rea
 Bruce Rechichar
 Joseph & Linda Redmond
 Emmett Reed
 John Reinhardt
 Stanley Rice
 George Richard
 Alex & Maria Richards
 John & Sally Richards
 J. Mark Richardson
 Richard & Sylvia Rickard
 Doug Riedel
 Michael Rief
 Lisa Rizzo-Zarr
 Daniel & Reiko Robbins
 Phillip & Peggy Robidoux
 Rockwell Collins
 Harold Rode
 John Rodgers
 Rosa Rodriguez
 Keith & Janet Roesner
 Toni Rogero
 John Rogers
 Russell & Joselle Rogers
 David & Patrice Rohde
 Ronald Rohlik
 Richard Romero
 Ferdinand Rosa
 Robert & Laura Roscoe
 Steven Rothstein
 David Rowney
 Scott Rudin
 Thomas Rumney
 Michael & Deborah Runde
 Travis Rushing
 Daniel & Donna Sablich
 Cecelia & Michael Salcido
 Salter Labs
 Hussein Salty
 Gilbert Saltzman
 David Sams
 Daniel Sandblom
 Michael Sandford
 Kevin Sannes
 Anne & Stephen Sargent
 Scott Sayles
 Ralph & Roberta Scaramella
 Susan & Gregory Schaffer
 Larry Schick & Patty Knight
 Richard Schilk
 George Schlegel
 Steven Schmidt
 Theodore & Janice Schmidt
 Grant Schmieder
 Nick & Jean Schott
 Richard Schrum
 Anthony Schultz
 Leonard & Brenda Schultz
 Michael Schwager
 Kevin Scott
 Laurence Scott
 Lisa Sedacca
 Allen Schloff
 Ruth & Paul Seppala
 Nelson & Virginia Severinghaus
 Laverne Severud
 Narendra Shah
 Somnath Shahapurkar
 Joseph Shaw
 Angleat & David Shelikoff
 Leonard & Beverly Shenfield
 Marie Shepherd
 Daniel Sherwood & Cara
 Groshens-Sherwood
 Suzanne Shields
 Mark Shill
 David Shoemaker
 Eugenie Sholl
 Marcus Short
 Stephen & Julie Silliman
 Silver Light Productions
 Barbara Simmons
 Daniel Simon
 Robert Simpson
 Teddy & Sheila Simpson
 Ajeet Singh
 Mary Sleet
 Mithkal Smadi
 Forrest Smith
 Jerald Smith
 John & Rachel Smith



Courtesy of UA SAE Baja Racing Team

Sponsors help support many student activities in the UA College of Engineering, such as the Society of Automotive Engineers (SAE) Baja Racing Team. The club's 2006 car (above) is at the starting line of an SAE Baja race in South Dakota. Tomcar, a manufacturer of off-road vehicles in Phoenix, has donated \$12,000 worth of parts to the 2007-2008 team, enough material to allow UA's team to campaign two cars in at least one, and possibly two, of this year's Baja SAE events.

Rodney & Marie Smith
 Timothy Smith
 Larry Snapp
 Nancy Sollinger & James Calieuri
 Ken & Mary Sorenson
 Maria Soto
 Andrew Sparks
 Ronald Spiegel
 Frank Spittle
 Donald Spong
 Stanley & Jodi Stachowiak
 John & Patricia Stanley
 Robert & Diane Steenbergen
 Richard & Anne Steiner
 David & Dorothy Steinheimer
 Donald & Sharon Steinwachs
 Daniel & Deborah Stephens
 Larry & Sandra Stephens
 Larry Sternaman
 James & Alice Stevens
 William & Tammi Stevens
 William R. Stevens
 Dale & Susan Stevenson
 Wayne Stewart
 Douglas & Cathine Sticht
 Alice Stilwell
 Bonnie Stirnweis
 Walter Stoss
 Robert Stott
 Daniel Strout
 Mark & Debra Stratton
 David Streubel
 Gregory Strimbu
 Irving Studebaker
 Ganesh Subramaniam
 Sakthivel Subramanian
 Mark Sullivan
 Robert Sullivan
 Wayne Sunne
 Neil Sutter
 Sam Swan
 Wing Sy
 Jack Sykes
 Noah Syroid
 Neil Tamppari
 Albert & Cecilia Tarcola
 Douglas & Karen Taylor
 James & Sandra Taylor
 Mark Taylor
 John Terrell
 Richard & Phoebe Therrien
 Edward & Shirley Thomas
 Justin & Pamela Thompson
 Keltan & Doris Thomson
 Patricia Thomson
 Paul & Donna Thorne
 David & Cynthia Tipper
 Rita & Joseph Titus
 Jack Tleel
 Lamar Todd

James Tofel
 Scott & Cheryl Toland
 Mark Tomes
 Thomas Tone
 Yi Torng
 Joseph Torrano
 David & Edwina Troupe
 Kenneth Trout
 Allen Truby
 John Tryniski
 Amos Tsai
 John Tsitouras
 Graham & Sarah Tubbs
 Michael Turik
 Justin & Linda Turner
 Kristofer & Janet Tvedt
 Jesse & Joan Tyler
 Jerome Uchiyama
 Lynn Underhill
 UA Department of Agricultural
 Education
 United Space Alliance
 United States Steel Foundation
 United Way of the Bay Area
 David Unkrich
 Guy Vaillancourt
 Juan & Maria Valdés
 Harry Valentine
 Joyce Valenzuela
 John & Sandra Vanecho
 Sandra Varga & Paul Sako
 Varian Medical Systems, Inc.
 Alan & Elaine Vaughn
 Brian Vazquez
 Anne Marie & Alfonso Velosa
 Richard & Janet Vitales
 Vincent Vlach
 Harvey & Judith Voss
 Loren Waddell
 John & Erika Wade
 Walter Walker
 Susan Walker
 Robert & Lorraine Wallace
 Tony & Dorah Walls
 Jeffrey Walser
 Richard & Charlotte Walters
 Joel Wantman
 John Ward
 William Ward
 Aaron Warriner
 James Washburne
 Beth Weaver
 Brian Webb
 Nicholas Webb
 Ralph & Pamela Wege
 Joan Weinberg
 Herbert & Diane Welhener
 Harry Wells
 James & Ann Werner
 Tony Werner

Robin West
 Justin Wheeler
 Kermit Whitt
 William Whitty
 Walter Wickboldt
 Robert Wickliffe
 Gary & Jane Wiese
 Lynn & Doreen Wilcox
 Walter Wilcox
 Clayton Williams
 Douglas Williams
 Jennifer Williams
 Ronald & Mary Williams
 John & Phyllis Wilson
 Robert Wilson
 Terril & Esther Wilson
 William & Christine Wilson
 Craig Windrem
 Linda Wisdom
 Walter & Stephanie Witkowski
 Kim Wittman
 David Wittwer
 Igor Wojewoda & Leigh Austin
 Brad Wolaver
 Jerry Wolf
 Sarah Wolfe
 Dale Wong
 Beverly & William Wood
 Frederick Wood
 Michael Woodard
 Charles Woodman
 Mark & Guadalupe Woodson
 Woodson Engineering, Inc.
 Paul Woolard
 David & Kathryn Woolhiser
 Buel & Beverly Woolverton
 Richard & Anne Wyman
 The Xerox Foundation
 Josephine Yang
 Thomas Yi
 Dennis & Mary Yoder
 Torao Yoshida
 Benny & Bobbie Young
 Don Young
 James & Wendi Young
 Larry & Jean Young
 Paschel & Macrose Young
 David & Lane Yow
 Henry Yu
 Gordon Zaft
 David & Danielle Zaleski
 Zavis Zavadni
 Gregory Zeihen
 Michael Zelnick
 Susan Zevin
 Joyce Zevnik
 Eugene & Janice Zimmerman
 Jeffrey & Kathleen Zuber
 Helga & Keith Zwickl
 Richard Zwicky



Matt Bratley

Professor Hamid Saadatmanesh inspects the underside of a bridge in Tucson. The American Society of Civil Engineers (ASCE) reports that 27.1 percent of the nation's bridges are structurally deficient or functionally obsolete. Saadatmanesh has spent six years developing and testing a technology that could bring many of these bridges up to better-than-original specifications. A paper he wrote on the process was named the best paper in 2001 for ASCE's Journal of Composites for Construction.

A low-cost, high-tech way to strengthen deteriorating bridges

A UA engineering professor has developed an easy, low-cost way to strengthen the nation's aging steel and concrete bridges.

The technology could have prevented Minnesota's IH-35W bridge collapse and could be used to repair tens of thousands of substandard bridges, says Prof. Hamid Saadatmanesh, of UA's Civil Engineering and Engineering Mechanics Department.

Saadatmanesh's process could bring the structurally deficient bridges up to better-than-original specifications and could strengthen some obsolete bridges so they could exceed their

original specifications and carry more traffic.

The process is simple and fast. The bridge girder to be repaired or strengthened is first cleaned. If it's a concrete girder with rebar weakened by corrosion, the girder is wrapped on three sides with a carbon-fiber mesh that is similar in appearance to fiberglass cloth, but structurally much stronger. This carbon-fiber material is simply glued to the girder using a special epoxy.

In the case of a steel girder, the cloth can be glued across a crack, overlapping as little as six inches. If an entire

girder needs to be strengthened to carry a heavier load, the cloth is glued along one side of the girder.

While the carbon fiber is much more expensive pound-for-pound than steel, the entire process is much cheaper than welding or bolting a steel plate across a crack, Saadatmanesh said. "You have to consider the entire cost," he noted.

Carbon fiber also will not deteriorate like steel. It can bend almost an infinite number of times, and it's also highly corrosion resistant.

•
More info: Saadatmanesh

Students design stove for elderly, disabled

A team of UA engineering students, working with people from Tucson's disabled community, have designed a cooktop that's nearly burn proof, shuts off if left unattended, and is height adjustable. "Cooktop" is a term used for a stand-alone range that does not include an oven.

The project began when a United Way representative contacted faculty who direct UA's interdisciplinary senior design course looking for students to design a cooktop.

The students started with a standard glass stove top and then built the rest of the range around it.

The glass surface next to the pot gets only warm to the touch because the burners work by induction, which heats only the metal pot through an electromagnetic field, not the glass.

The students arranged the burners in a triangle, with one in the front and two in the back. This reduces the chance of touching a hot pot or turning one over while reaching for something on a rear burner.

The cooktop also includes push-button controls, rather than hard-to-turn knobs, and an adjustable cylinder in each leg. These cylinders work in unison to raise or lower the unit so



The United Way cooktop.

that it can be used by both a person in a wheelchair and by a spouse or helper who prefers to stand while cooking.

•
More info: Stove

Matt Bratley

Moving Traffic

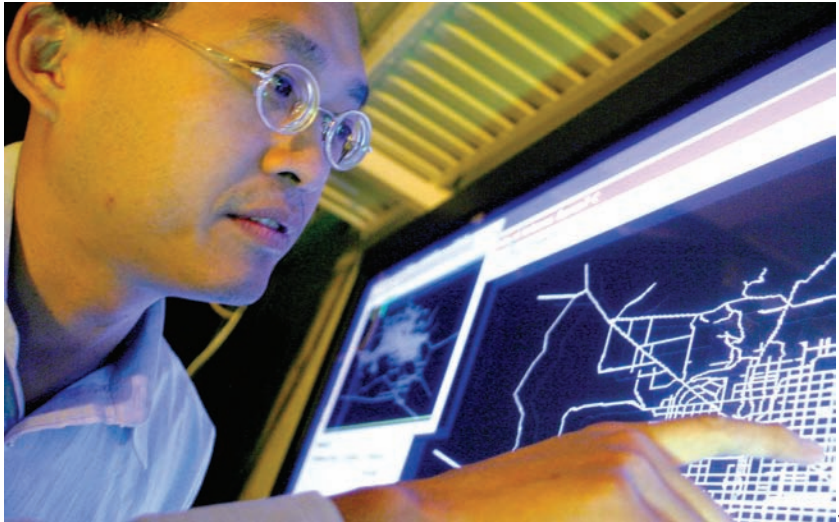
UA engineers to help ease traffic woes in Minneapolis and St. Paul following interstate bridge collapse

The Federal Highway Administration has asked Assistant Professor Yi-Chang Chiu to use an urban traffic simulation model developed at UA to help in rerouting traffic in Minneapolis following the collapse of the IH-35W Bridge.

Seventy percent of the traffic through the collapsed IH-35W Bridge is downtown-bound, and the bridge carries more than 140,000 cars daily.

Rerouting traffic requires an accurate prediction of traffic movements within the city, said Chiu, of UA's Civil Engineering and Engineering Mechanics Department.

Chiu's team is developing a traffic simulation model for the entire cities of Minneapolis and St. Paul. The researchers then will use the model to simulate and evaluate a selected number of mitigation strategies approved by the Minnesota Department of Transportation (MnDOT)



Mat Brailey

Prof. Yi-Chang Chiu examines traffic flow on a traffic simulation model in UA's Advanced Traffic and Logistics Algorithms and Systems (ATLAS) Laboratory.

and the Federal Highway Administration (FHWA).

Chiu has been developing the traffic simulation software since 1995, when he was a graduate student at the University of Texas in Austin.

"Solving large-scale problems like this one is overwhelming without a sophisticated simulation package," Chiu said. "No one can just sit down with a map and draw lines and figure out the best answer to problems like these."

The software works with traffic census and planning data, which is collected by state and city transportation agencies, in conjunction with real-time traffic surveillance data.

FHWA or MnDOT will use the model to evaluate several mitigation strategies, including re-timing traffic signals and rerouting traffic through other corridors or highways, Chiu said.

•
More info: Chiu

Predicting

Continued from Page 1

ences, said Rozenblit, who holds the Raymond J. Oglethorpe Endowed Chair in the Electrical and Computer Engineering (ECE) Department.

The software can handle data loads that would overwhelm human analysts, while dispassionately exploring actions and behaviors based solely on the data, sidestepping human cultural biases that might rule out unorthodox or seemingly bizarre courses of action.

Actions sometimes defy logic

Since the end of the Cold War, our opponents have behaved in ways that defy what we would consider normal logic, pursuing actions that we find almost inconceivable, said Rozenblit, who heads the ECE department. Predicting these asymmetric behaviors is difficult and further complicated by the massive amounts of intelligence

data available.

ATRAP will use sophisticated computational methods based on game theory, co-evolution and genetic development models to find solutions that make sense in illogical times.

Predicting the unpredictable

"The computer can explore very large and complex data sets that, as an individual or group, you could never analyze," said Brian Ten Eyck, ATRAP project manager and associate director for research support in ECE. "ATRAP will serve as a cognitive amplifier for human analysts, suggesting connections and behavior patterns — and even predicting specific scenarios — that might never occur to them."

In unstable areas, winning often means establishing an environment in which the factions co-exist in a win-win situation or at least in an equilibrium in which there are no rewards, and some penalties, for disturbing the

status quo, Rozenblit said.

Quick Response is Vital

Ultimately, the software program will be designed to display data in graphical, 3-D and other forms that can be quickly grasped, allowing decision makers to rapidly respond to changing situations, Rozenblit said.

In managing conflicts such as those in Kosovo or Somalia in the 1990s, commanders will need to respond quickly. "In those situations, we don't have two months to figure things out," Rozenblit said. "So the second part of our project involves harnessing massively parallel computing architectures to do computations very rapidly."

"The goal is to handle conflict areas in a manner that leads to stability and support so war is not necessary," Rozenblit said. "That's the philosophy behind much of the ATRAP effort."

•
More info: ATRAP

Show Time

Engineering and theater students combine skills, make high-tech stage sets

Engineering and theater students are working together at UA to design the kind of sophisticated stage machinery that's used at stadium rock concerts and in Cirque du Soleil and similar productions.

For the past three years, the Advanced Motion Control class has been offered to graduate students in Theater Technology and to graduate and undergraduate students in Electrical and Computer Engineering (ECE), said Prof. Peter Beudert, who directs the Design Division in the School of Theatre Arts.

Beudert and other faculty members hope to expand the concept into a multi-course offering that will lead to a master's degree option in Engineering and an entertainment technology certificate in Theatre Arts.

The class and certificate and degree option programs are designed to develop engineers who can work in the performing arts, as well as theater spe-



Peter Beudert

During the inaugural semester of UA's Advanced Motion Control course, students built a stage set that has sections that can be independently elevated.

cialists who have a strong background in engineering, said ECE Assoc. Prof. Hal Tharp, one of the professors who teaches the class.

In addition, Beudert believes the program could benefit Tucson and Arizona by attracting companies that produce high-tech theater equipment and one-of-a-kind stage sets.

"Every year we've had a great mix

of students," Beudert added. "The partnerships created have been strong and all the students have learned a tremendous amount from each other. The course has really given them a chance to grow in ways that aren't possible if they stay only in their own disciplines."

•
More info: Beudert

UA hydrologist studies huge natural gas reserves created by microbes

Some of the largest natural gas reserves in the world are being created by microbes and could potentially be a renewable resource.

Jennifer McIntosh, a groundwater geochemist in UA's Hydrology and Water Resources Department, is studying the factors that influence how microbes create these gas fields and how fluids migrate in the subsurface.

She also is exploring how conditions miles underground could be modified to create more gas resources and how they might be used to sequester carbon dioxide from the atmosphere.

Her work is of vital interest to the oil and gas industry in the areas of exploration and exploitation of microbially generated gas fields.

The biogenic gas deposits are found

in sedimentary basins worldwide, including in the mid-continent United States and Canada — specifically the Michigan, Illinois, and Appalachian basins. These biogenic gas deposits are also found in basins in the West, such as the San Juan Basin in northern New Mexico and the Powder River Basin in Wyoming and Montana.

McIntosh has ongoing, funded projects in all three mid-continent basins, and her research focuses on understanding how groundwater flow affects microbes that generate methane within organic-rich shales and coal beds that are found up to 4 kilometers underground.

The research also is important for determining the source and timing of freshwater recharge and how that recharge affects the quality and



Courtesy of Jennifer McIntosh

Jennifer McIntosh at a field site.

sustainability of underground water resources that provide water for Midwestern cities.

•
More info: McIntosh

Alumni Echoes

Former dean's wife turns 100, recalls '50s campus

Agnes Matsch — wife of former UA Engineering Dean Leander Matsch — turned 100 recently, something she never expected back in 1950.

Not that she thought 100 was out of reach, but she never dreamed she'd hit the century mark in Tucson, Ariz., a place she hadn't even heard of as the '50s began.

In 1954, Leander, who was 52 at the time, wanted to leave his teaching post at Chicago's Illinois Institute of Technology to relocate in Tucson.

Campus Grew Rapidly

UA was expanding rapidly at that time under President Richard Harvill, who was striving to make it the outstanding research and technical university in the West.

The proposed move "didn't sit well with me," Agnes remembered. She was a Chicago native, loved her home in Park Ridge, and was accustomed to big city amenities such as public transportation that was so good she never learned to drive.

She and her husband visited UA in 1954, and Tom Martin, head of Electrical Engineering, offered Leander a job, which he accepted on the spot.

Back in Chicago, the first thing Agnes did was to learn to drive.

Lots of packing and dealing with the movers followed. Then on a Friday night in

1955, with the family scheduled to leave the following day, Agnes, Leander and their two sons — Lee and Eugene (both UA grads) — were finishing up the last odds and ends in preparation for driving two cars to Tucson. (Their daughter, Marjorie, had already married and left home.)

A Change of Plans

"Then the boys came in and said, 'Mom, Dad fell in the street and can't get up.'" Agnes discovered that he'd tripped on the steps and torn a tendon in his knee.

The doctors decided to operate, but "they weren't going to operate until Monday, and the boys and I had to get out to Tucson to claim the furniture," Agnes said.

They had to leave Leander in the hospital and head West with Agnes's new driver's license, arriving in the midst of Tucson's stifling August heat.

"I would have happily moved back to Chicago the following week," Agnes said.

Leander followed 10 days later by plane. But as fall semester began, his knee prevented him from driving, and Agnes had to drive him to campus.

Meanwhile, the family was living in temporary campus housing and searching for a home. It seemed everyone

knew of just the house for them — even the mailman and milkman were in real estate

part time.

Finally, Agnes found a realty company on Speedway that showed her a house in a new subdivision on the eastern edge of town — out around Craycroft Road, which is now in the center of the city. There she found the ideal house, where she has lived ever since.

After moving in, "I found we were not in the city limits, which ended at Alvernon at the time," she said. "We also couldn't get a telephone at first. When we did, it was a four-party line."

The closest grocery was at Swan and Broadway, and Swan was a two-lane. Now it's a major, four-lane arterial.

Heading Downtown

"Everything else was downtown," she said. "We had no shopping malls." So she'd drive downtown to shop at Jacome's, Steinfelds, and other stores that now exist only in the memories of longtime Tucsonans.

Many other wives of new faculty members found themselves similarly marooned in the Western desert in the 1950s, and they banded together for mutual support in a newcomer's bridge group, which met on campus. There were six tables at that time. The group still meets more than 50 years later, but now there are only two tables.

Leander eventually was named acting dean of the Engineering College in 1963,



Ed Stiles

Agnes Matsch with one of her husband's books, for which she typed out the entire manuscript on a manual typewriter.

and served for one year.

During his years at UA, Leander wrote *Electromagnetic and Electromechanical Machines* and several other EE texts, all of which Agnes typed in manuscript form on a manual typewriter. "I'm not sure I'd do that today," she said, laughing.

Leander retired in 1972 and was asked to continue teaching halftime but decided to travel instead. He and Agnes took three trips to Europe and continued traveling until he began suffering strokes. He died in February 1984.

Despite leaving the city for small-town Tucson and resenting the move at the time, Agnes now says, "It turned out to be a good move. Now that I think of it, I don't think I'd like to live in Chicago again."

•
More info: Matsch



NASA Photo

Astronaut Don Pettit

Pettit will return to space next fall

When we last heard from NASA astronaut and UA Engineering alum Don Pettit, he was in Antarctica with ANSMET (Antarctic Search for Meteorites) scientists camping on the ice and searching for meteorites.

Now it looks like Pettit will soon be off on another adventure.

NASA has announced that Pettit will be aboard space

shuttle mission STS-126, which is slated to fly in September 2008. The shuttle will deliver equipment to the International Space Station (ISS).

This will be Pettit's second spaceflight. He first flew as a crew member on ISS Expedition 6, logging more than 161 days in space, including more than 13 hours outside the station on two spacewalks. He traveled to the station aboard

shuttle mission STS-113 in November 2002 and returned to Earth on the Soyuz TMA-1 spacecraft in May 2003.

Pettit earned his bachelor of science degree in chemical engineering from Oregon State University in 1978 and a doctorate in chemical engineering from The University of Arizona in 1983.

•
More info: Pettit

At 99, mining alum remembers UA in the 1920s

Robert Lenon, MinE '30, came to Arizona just as it became a state, and eventually roamed the desert, making a living by mining, surveying, buying and transporting ore and doing just about anything else that was mining or survey related from the depths of the Great Depression through many decades afterwards.

He went to France and Okinawa with the Army Engineers during World War II, moved to Patagonia, Ariz. after the war, and turned 99 on Nov. 1 — making him possibly the oldest living UA Engineering alum.

We recently caught up with him at his home in Patagonia, where he and his wife, Naomi, still live — just 12 miles north of the Mowry Mine, where he took a surveying course that earned him the last three units he needed for his degree.

In 1929, Lenon went to work at the Calumet and Arizona Mine in Bisbee, Ariz. Unfortunately that was just a few months before the stock market crash of October 1929, which brought on the Great Depression, and he was laid off in 1930.

Life on Campus

Before that, however, Lenon spent four years — from 1925 to 1929 — studying Mining Engineering at UA.

Lenon remembers that UA

was at the end of the streetcar line in those days and the desert started on the eastern edge of campus.

He turned 17 during the fall semester of 1925 and lived at the Square and Compass House on the northeast corner of Park Ave. and East Second St. But he moved to Cochise Hall for his last two years to do more studying and improve his grades.

Life Outside Class

To take a break from studying, “we would take the streetcar downtown for a nickel,” Lenon said. “But it was just as easy to walk.”

At other times, he and his friends would camp out in Sabino and Bear Canyons, and his class took field trips to mines in Arizona and Sonora. He also enjoyed ROTC horse cavalry training.

After his freshman year, he got a summer job with a movie company in the California sand dunes west of Yuma. During summers after his sophomore and junior years, he worked in a Yuma service station, putting in 84 hours a week for \$25.

After losing his mining job in 1930, Lenon returned home to Yuma and picked up mining and engineering work wherever he could find it. “Jobs lasted only a month or two because people had so little money

then,” he said. Sometimes he worked just for room and board.

Eventually, he was hired by the All-American Canal Co., where he guided contractors and others along its proposed route, headed the drafting section, and led the survey crew.

In 1935, he left the canal company and was rehired by Phelps Dodge to work at the Bisbee and Morenci Mines.

A few years later he struck out on his own to operate a Tungsten mine in the Huachuca Mountains, supervise a gold mine near San Diego and to work on other small-mine projects.

As World War II loomed, he enlisted in the U.S. Army in 1941 and spent the next six years working for Uncle Sam.

Back to Patagonia

Back in Patagonia after the war, he was surprised to find that most of the small mines in the area had closed. But he was determined to stay in Patagonia and to make a living in mining.

He set up a business in buying and shipping ore for small mines and took on surveying work that included mapping claims, surveying property lines and similar work.

His future wife, Naomi Wagner, was a friend of the family who came out to Phoe-



Ed Stiles

Robert Lenon

nix from Nebraska to teach school in 1946. They were married in 1951 and raised two daughters and a son.

Lenon retired in 1975. Until a few years ago, he still took on mine-related consulting jobs.

Today, he thinks back on how much things have changed from the days when only a dirt road linked Patagonia to Tucson.

It seems like only yesterday, he said.

And that is, in fact, the title of two volumes he recently wrote about his life in Arizona. *It seems Like Only Yesterday: Mining and Mapping in Arizona's First Century* was co-authored with Robert and Judith Whitcomb. The books are available from Mariposa Books & Gifts in Patagonia, Ariz. and from iuniverse.com.

•
More info: Lenon

In Memoriam



Ed Stiles

George Sorkin at UA's 42nd Engineers' Breakfast in 2005.

George Sorkin, who endowed the George and Ruth Sorkin Scholarship in UA's Materials Science and Engineering Department, died June 30. He was 89.

Sorkin, a 1938 UA Chemistry graduate, retired as the director of the Ship Structures and Material Technology Branch of the Naval Ship Systems Command in 1980. He is recognized for his work in advanced materials problems

relating to large-scale naval systems.

After retirement, Sorkin joined the Institute of Defense and Analyses as an adjunct staff member.

Sorkin studied at the City College of New York, and then came to UA in the fall of 1933.

Following graduation, he worked for Asarco Smelting & Refining Co. in New Jersey and later became plant superintendent at Golden Industries.

During World War II he joined the Navy and was stationed in Washington, D.C.

Sorkin was the author or co-author of many technical journal articles and lectured extensively. In 2002, he was named a Fellow of ASM International (The Materials Information Society).

He also received awards from the Department of the Navy and the American Society of Naval Engineers.

Alumni Echoes

Chuck Kimberle, University of North Dakota



Wayne Seames (right), ChE '79 and Ph.D. '00, accepts the 2007 UND Foundation/Thomas J. Clifford Faculty Achievement Award for Excellence in Research from University of North Dakota President Charles Kupchella. The award was presented at the 2007 UND Founder's Day banquet. Seames, an associate professor of Chemical Engineering at UND, also was named the SEM Outstanding Professor in 2006.

"What makes his efforts truly exceptional is that he has built a major research program while demonstrating excellence in teaching and has been unselfishly committed to performing major administration and service duties," said John Watson, dean of the UND School of Engineering and Mines.

John C. Andreas, EE '40, tells us that when he graduated from UA, the Electrical Engineering Department consisted of two professors and part of one floor of the Engineering Building. The only course in electronics was on vacuum tubes, and that was taught in the Physics Department.

"The engineer's computer was the K&E slide rule," Andreas says. "There were fewer than 20 electrical engineers in my graduating class. Only two of us had jobs on graduation."

After graduation, Andreas worked with General Electric Co. and Westinghouse. Following Pearl Harbor, he was transferred to the U.S. Navy Bureau of Ships.

Andreas and his wife, Ruth, were married while at UA, and they retired to Scottsdale, Ariz. in 1978.

"It's amazing how the world has changed and the many

opportunities available for engineers today," Andreas says.



Glenn Bishop

Glenn Bishop, CE '82, has been named president of the Redondo Beach, Calif. Chamber of Commerce.

Bishop is managing director for the Portofino Resort and Yacht Club in Redondo Beach.

Clay Condon, ME '04, wrote about his work in Qatar with ExxonMobil for Business Week magazine in the July 8, 2007

issue. Condon, who graduated with degrees in engineering and economics, is an analyst in the business support group. He is primarily responsible for coordinating planning efforts and developing financial analyses.

Condon held a Thomas R. Brown Distinguished Scholarship while at UA. To read more about the Brown Scholarship program, see Page 11.

You can read Condon's *Business Week* story about working in the Middle East at: http://www.businessweek.com/bschools/content/jul2007/bs2007078_499377.htm



Clay Condon

Dustin Kwok, CE '95, is a lieutenant in the U.S. Navy Civil Engineer Corps assigned to Naval Facilities Engineering Command Southwest. He's stationed at the Naval Weapons Station in Seal Beach, Calif.

As a Facilities Engineering and Acquisition Division officer, his office provides facilities acquisition, installation engineering and support services to Navy, Marine Corps, and Air Force activities throughout the greater Los Angeles Metropolitan area.

Kwok completed a tour of duty with the U.S. Navy Seabees last year. He was stationed in Gulfport, Miss. and was directly involved in the Hurricane Katrina relief and recovery effort.

From October 2004 to May 2006, Kwok was deployed to Okinawa, Japan and Guam.



ABS Photo

Donald Liu

Donald Liu, Ph.D. ME '78, was one of 15 people who received awards from the National Academy of Sciences in 2006 honoring their outstanding scientific achievements. Liu was awarded the Gibbs Brothers Medal "for first introducing finite element techniques into ship design and being the driving force behind the revolution in basing classification society rules on scientific principles."

Liu is a board member of ABS and the retired executive vice president and chief technology officer of ABS, which develops and verifies standards for the design, construction, and operational maintenance of marine-related facilities.

Send us e-mail!

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

Please send us an e-mail including the following:

- Name
- Major
- Degree (BS, MS, Ph.D.)
- Year you graduated
- Rundown on your activities (Please limit your submission to 200 words or less.)

While you're at it, get out that digital camera or scan a print and send us a digital photo 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 comments and photos in the next *Arizona Engineer*.

Please send your e-mail to stiles@u.arizona.edu.

Alumni Echoes

Bret Becker, Communications '04, poses with his quarter scale Gee Bee racer (right) after its maiden flight in Sepulveda Basin, Calif. last Memorial Day.

Although Becker didn't major in engineering, he's well known to many engineering grads because he was a key member of UA's Micro Air Vehicle (MAV) team that took first place in the ornithopter competition and second place overall at the 2004 International Micro Air Vehicle Competition.

Becker's Gee Bee, which he started building while at UA, took four years to complete.

The plane is a scale model of one of the two nearly identical Gee Bee airplanes the Granville Brothers built for the national air races in 1932. At the time, the Gee Bees were the fastest airplanes in the world. Becker's is modeled after the R-2, which was built for the Bendix Trophy race from Burbank, Calif. to Cleveland, Ohio.

Becker got started building and flying radio-controlled model airplanes when he was 13 and eventually graduated to building and flying demanding, rarely built models like the Gee Bee.



Bob Halvorsen Photos

Originally designed for a gas engine, Becker highly modified the kit plane to accept a 2,000-watt electric motor. The switch to electric power came as a result of his experience with electric power plants for the MAVs he built at UA.

Becker's Gee Bee has a 75-inch wingspan, weighs 16.5 pounds, and swings a 19-inch

prop. By comparison, the largest MAV the UA team built while Becker was in school had a wingspan of just 12 inches.

To see a video of the R-2's maiden flight, go to <http://media.putfile.com/pdawgs-Gee-Bee-R2-Maiden>

"I wasn't sure how fast its stall speed was, and I didn't want to find out on the first

flight. So I landed pretty fast," Becker says, explaining why the plane took a long roll-in and nose-over on landing. "It flew extremely well, and it will knife edge without rudder due to its fat fuselage," he added.

Becker recently earned a master's degree in biochemistry from USC and has now been accepted to medical school.

The University of Arizona
Arizona Engineer
College of Engineering Newsletter
Tucson, AZ 85721-0072

Nonprofit org.
**U.S. Postage
Paid**
Tucson, Arizona
Permit No. 190