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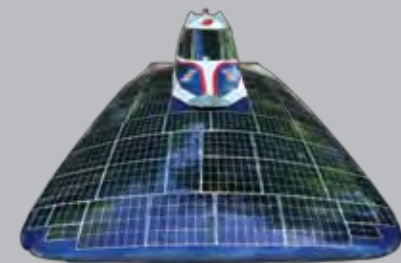
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Courtesy of Jennifer Eufemi

Movers and Shakers—Doctoral students Matt Schoettler of UCSD (left) and Dichuan Zhang of UA (center), and Professor Robert Fleischman (right) inspect the second floor of the 500-ton test parking structure at the Englekirk Structural Engineering Center.

Earthquake Engineering Project Will Save Lives and Billions of Dollars

\$2.5 million study will lead to improved building codes

The 6.7 magnitude earthquake that struck the Los Angeles community of Northridge at 4:30 a.m. on Jan. 17, 1994, killed 57 people, injured more than 5,000, and caused an estimated \$20 billion in damage, making it the

costliest seismic disaster in U.S. history.

Structures that should have withstood the quake, such as parking garages and freeway overpasses, collapsed and set in motion a major overhaul of building codes.

“If the earthquake had happened three hours later...” The potential horror of what could have been

causes Professor Robert Fleischman’s speculation to trail off. Fleischman, who holds the Delbert R. Lewis Distinguished Professorship in Civil Engineering and Engineering Mechanics, is about to finish the first phase of a 5-year, \$2.5 million earthquake engineering study that will lead to improved building codes,

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The Future: Mission Possible

New school and department will secure College's future

By Jeff Goldberg, Interim Dean
College of Engineering

I'm sure some of you were expecting a different photograph on this page. I'm Jeff Goldberg and I became dean on Jan. 1, 2009, when my good friend and colleague Tom Peterson went to Washington, D.C., to lead the National



Science Foundation's Directorate for Engineering. Since then, I have been working with faculty, staff and students to chart our direction during the next 5 years while Tom has been deciding how to spend the engineering directorate's share of the NSF's \$3 billion stimulus package.

My role as dean is to develop an infrastructure that will enable us to best perform our mission of education, research, service and outreach. As I evaluate how we currently work—and how we might work in the future—I remain focused on creating an environment that attracts the best students, faculty and staff.

Many changes are under way at the UA and College, including the creation of a Department of Biomedical Engineering, and the establishment of the School of Sustainable Engineered Systems, or SSES, which will consist of the departments of Civil Engineering and Engineering Mechanics, Mining and Geological Engineering, Chemical and Environmental Engineering, Materials Science and Engineering, and Systems and Industrial Engineering.

The SSES will focus on critical linkages between systems in environment, energy, water

and materials. The school will bring together more than 50 faculty members and draw on expertise throughout the campus. We see SSES as the cornerstone in using basic science and knowledge to bring problem-solving systems and devices that consider public policy and market challenges.

One of the many strengths of the school is the inclusion of Systems and Industrial Engineering. Taking the systems approach, rather than tackling individual components, will enable us to design interfaces, understand and quantify unexpected consequences, and consider large-scale models—all critical for solving difficult problems.

Biomedical engineering is an area of tremendous potential for Tucson and Arizona. We are already strong in medical imaging, nanomedicine, and cardiovascular and neural engineering. Bringing in faculty from the colleges of Medicine, Science, and Agriculture and Life Sciences will intensify that strength.

I look forward to working with each of you as we continue to refine and enrich the College of Engineering. Please feel free to contact me and please drop in if you are in the neighborhood.

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

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



College of Engineering/Pete Brown

Eye Robot—An Engineering 102 student watches his Lego robot scale a ribbon suspended from one of the AME bridges.

Ribbon-Running Robots

As part of the Introduction to Engineering course (Engineering 102, Section 1), engineering students designed robots that could climb three stories up a ribbon.

Engineering freshmen tested their robots for the first time Dec. 2 in the

courtyard of the AME building. The test run enabled the students to plan last-minute design modifications in preparation for the Engineering 102 open day on Dec. 4.

The open day was part of a College pilot program with Hamilton High School in Chandler, Ariz.

Senior Gets Scholarship at Saudi University

Mechanical engineering senior Azeem Shahid has been awarded a Discovery Scholarship by King Abdullah University of Science and Technology in Saudi Arabia.

Shahid will graduate from UA in May 2010 with a bachelor's degree, and enroll in a master's degree program at KAUST in the fall of 2010. "Most likely in chemical and biological engineering," Shahid said. KAUST is scheduled to open in September 2009 and will only offer graduate degrees.



Azeem Shaheed

Jim Baygents Appointed Interim Academic Dean

James Baygents is the College of Engineering's new interim associate dean of academic affairs. He succeeds Jeff Goldberg, who recently became the interim dean.



Jim Baygents

Jim Baygents joined UA Engineering faculty as assistant professor in 1991, the same year he got his doctorate in chemical engineering from Princeton University. Baygents received a master's degree in chemical engineering from Princeton in 1981 and a bachelor's degree in the same subject from Rice University in 1980.

For three years before joining UA, Baygents was a visiting scientist, then a research fellow,

at the NASA Space Science Laboratory of the Marshall Space Flight Center in Huntsville, Ala. In 1995 he received the Arizona Mortar Board Senior Honor Society award for outstanding faculty service. In 1997 he was awarded an International Research Fellowship by the National Science Foundation for study at the University of Melbourne, Australia. He is a member of Phi Beta Kappa, Tau Beta Pi and Phi Lambda Upsilon societies; and of the College of Fellows at Rice University's Will Rice College.

"Jim has a clear sense of the goals of an engineering education," said Goldberg. "He has worked on all phases of our curricula, including analysis, practice and design, teamwork, communication, and ethics. He is well known for being a passionate advocate for quality in education, from both faculty and student perspectives."

Baygents' research interests include transport processes in natural and engineered systems. He is a member of the Department of Chemical and Environmental Engineering and the Program in Applied Mathematics at UA.

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Jennifer Duan gets NSF Career Award



Jennifer Duan

Assistant Professor Jennifer Duan has been awarded a grant of more than \$400,000 by the National Science Foundation to study the complex forces

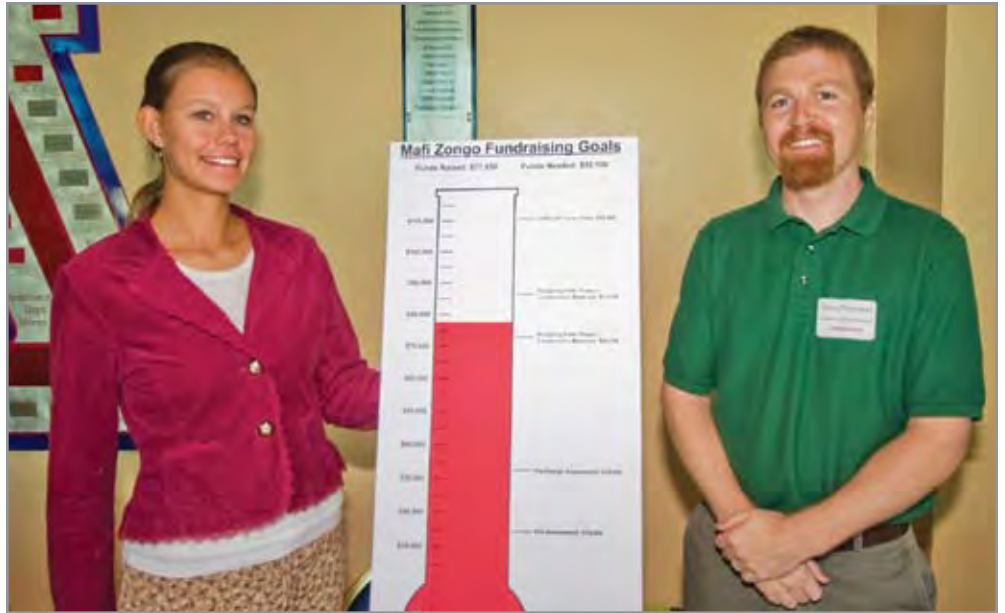
that determine how sediment is deposited in river channels.

Duan, of the UA's Department of Civil Engineering and Engineering Mechanics, was awarded the 5-year grant of \$415,560 under the NSF's prestigious Faculty Early Career Development Program. The program supports junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research.

Her research will provide valuable guidance for river restoration and enhance scientific understanding of river meanders. The project will involve undergraduates in research, establish a mentoring program for women students, develop a computer animation exhibition for science museums, and support outreach to high school students.

"We are going to build a new flume in the Civil Engineering courtyard," said Duan. "It will simulate a river basin and, by controlling the flow, we will be able to study how a small channel evolves into a meandering channel, just like the Mississippi River."

Duan plans to promote engineering among local high schools by setting up a week-long summer camp.



College of Engineering/Pete Brown

Putting the Fun in Fundraising—EWB-UA members Terra Michaels, internal vice president, and Dave Newman, project lead, fundraising at the Engineers Breakfast Oct. 24.

Frisbee-Flinging Fundraisers

The UA chapter of Engineers Without Borders organized Frisbee Without Borders, an Ultimate Frisbee competition to raise money for its clean water projects in Ghana and Mali in Africa.

The competition was held Nov. 9 in Tucson and attended by more than 80 people, who raised about \$1,300 for the projects.

The UA chapter started the Ghana water supply and purification project

in the village of Mafi-Zongo in 2005. Ultimately, the project will supply safe drinking water to approximately 10,000 people in 30 or more villages.

Trahern Jones, Tucson chapter president, said the group is also raising funds for an assessment trip to Mandoli in Mali, followed by one or two implementation trips. "We're looking at designing and constructing a rainwater catchment system to provide people and crops with water throughout the year," he said.

Warp Powered

Assistant Professor Roman Lysecky of the Department of Electrical and Computer Engineering has been awarded a Career Award grant of more than \$400,000 by the NSF to develop high-performance customizable computer chips.

Lysecky's research will focus on the emerging field of warp processing, which uses high-performance computer



Roman Lysecky

chips called field-programmable gate arrays.

"The original focus of warp processing was strictly performance," said Lysecky. "My research proposal expands warp

processing into a new domain of low power. Some systems don't actually need to be faster."

ASEM Award for Engineering Management

Mike Arnold and Jane Hunter, director and associate director, respectively, of the Engineering Management Program, brought good news on their return from the annual American Society for Engineering Management (ASEM) conference in November.



Namely—the Engineering Management Program had won ASEM’s Founders Award, which every year recognizes the outstanding ASEM student chapter.

This year’s ASEM Conference was hosted by the Department of Systems Engineering at the United States Military Academy in West Point, New York.

Melissa Sarmiento, academic advisor and Engineering Management program coordinator, said: “Our student chapter put in a lot of work this year and kudos to them for winning the best student chapter.”

Arnold agreed with Sarmiento: “I believe we garnered the Founders



Courtesy of Mike Arnold

Quality Management—Left to right: Engineering management seniors Cary Broschat, Joel DeLaRosa and Tim Budinger; Jane Hunter and Mike Arnold, associate director and director, respectively, of the Engineering Management Program; and engineering management senior Geiler Eckman.

Award because of our great student chapter of ASEM,” Arnold said. “The chapter is quite active hosting a variety of social activities. The chapter also increased membership significantly in ASEM.” What sets UA apart from other chapters, added Arnold, is the

mentoring provided by upperclassmen for newer students. “This mentoring includes ASEM-hosted exam review sessions where upperclassmen review course material and work out problems for the benefit of students in lower division courses,” Arnold said.

Shuttleworth Awarded Regents’ Professorship

Professor Jim Shuttleworth was made a Regents’ Professor Feb. 20.

Shuttleworth joined the Department of Hydrology and Water Resources



in 1993, and is also a faculty member in the Department of Atmospheric Sciences. He was director of the Center for Sustainability of Semi-Arid Hydrology and Riparian Areas, known as SAHRA, from 2004 to 2008.



Jim Shuttleworth

Shuttleworth noted that “being awarded a Regents’ Professorship is different. Selection is by those who know you as a person. It is all the more satisfying because of this.”

Much of Shuttleworth’s research focuses on how climate change is affected by land surfaces. He is particularly interested in changes

in global climate caused by deforestation in the Amazon basin and desert formation in Africa.

Commenting on the role played by the Arizona Board of Regents in selecting Regents’ Professors, Shuttleworth said it enabled the board to “highlight aspects of the successful UA enterprise.” He added: “But really we are just the tip of the iceberg. It is a joy to be part of a university that has quality in depth across such an amazingly broad spectrum of excellence.”

Champion of Multidisciplinary Engineering

Honors flood in from around the globe for Chandra Desai

Regents' Professor Chandra Desai has been awarded the 2009 Nathan M.

Ae FULL STORY Number 37 Newmark Medal by the Structural Engineering and Engineering Mechanics Institutes of the American Society of Civil Engineers.

In 2008, Desai was selected by the ASCE's Geo-Institute to receive the 2007 Karl Terzaghi Award.

Desai has the unique honor of receiving both awards, which are among the most prestigious at the ASCE. These awards reflect the multidisciplinary nature of Desai's outstanding and seminal work and its application in the fields of geomechanics, and structural and engineering mechanics.

On receiving the award, Desai said: "I am very pleased that the American Society of Civil Engineers has chosen me to receive the 2009 Newmark Medal and the 2007 Terzaghi Award. About two decades ago at The University of Arizona, we initiated and pursued interdisciplinary mechanics applied to various areas in engineering, such as geomechanics and structural mechanics, because they strengthen



Chandra Desai

the scientific base of geotechnical and structural engineering."

Desai added: "I am also glad that these recognitions have been awarded for the first time to a faculty member at any university in Arizona."

Selected Profile of Chandra Desai

In 1959, Chandrakant S. Desai, a young man from a small village in Gujarat, India, graduated from the University of Bombay's Victoria Jubilee Technical Institute with a bachelor's degree in civil engineering.

Fifty years later, Regents' Professor Chandrakant S. Desai of the Department of Civil Engineering and Engineering Mechanics is the recipient of accolades and awards from around the globe. He received his master's degree from Rice University in Houston in 1966, and his doctorate from the University of Texas at Austin in 1968.

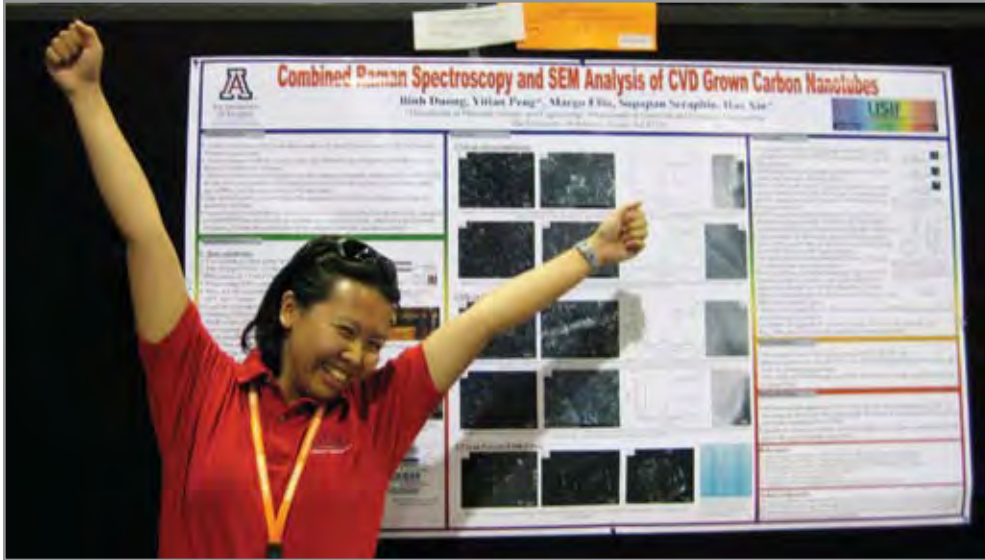
Desai's research in constitutive modeling for geomaterials has found applications in areas such as failure and reliability of microchip substrate systems in electronic packaging, and the movement of ice sheets on glacial tills, which influence global warming and climate change.

Desai's contributions have involved participation by about 50 doctoral and 50 master's students under his guidance. He was head of the Department of Civil Engineering and Engineering Mechanics from 1987 to 1991.

Desai is the founding president of the International Association for Computer Methods and Advances in Geomechanics and founding editor-in-chief of the *International Journal of Geomechanics*, published by the American Society of Civil Engineers.

Some Milestones and Awards

- Received the 2009 Suklje Award from the Slovenian Geotechnical Society
- 2009 Hind Rattan Award from the Nonresident Indian Welfare Society
- Delivered the 2009 Paul Fraser Kent Distinguished Lecture at the University of Illinois, Urbana-Champaign
- 2009 Diamond Jubilee Honour by the Indian Geotechnical Society
- Appointed Regents' Professor in 1989
- Head of the Department of Civil Engineering and Engineering Mechanics from 1987 to 1991
- Awarded the Alexander von Humboldt Foundation U.S. Scientist Prize by the German government
- Received the Meritorious Civilian Service Award from the U.S. Corps of Engineers
- Outstanding Contribution Medal from the Czech Society of Mechanics of the Czech Academy of Sciences
- Distinguished Contributions Medal from the International Association for Computer Methods and Advances in Geomechanics
- Clock Award for Outstanding Contributions to Mechanics and Thermal Sciences from ASME's Electrical and Electronic Packaging Division
- El Paso Natural Gas Foundation Faculty Achievement Award for teaching and scholarship at UA



Courtesy of Supapan Seraphin

Materials Girl—Binh Duong and her winning poster on spectroscopy of carbon nanotubes.

Best Poster Awards for MSE Students

Binh Duong, a new PhD student in Professor Supapan Seraphin's research group in the Department of Materials Science and Engineering (MSE), received best poster award in the advanced instrumentation category at Microscopy and Microanalysis 2008.

Binh presented the poster—Combined Raman Spectroscopy and SEM Analysis of CVD Grown Carbon Nanotubes—at the annual meeting of the Microscopy Society of America and the Microbeam Analysis Society, held in August 2008 in Albuquerque, N.M. Binh did the work while she was an MSE undergraduate.

"Due to their novel properties," said Binh, "carbon nanotubes have very

good potential applications, such as air pollution filters, electrical circuits and energy storage."

Professor Seraphin said the award was "exciting, and an indicator of the high caliber of research at the UA."

Margo Ellis, another PhD student from MSE, received best poster award for physical science at the annual meeting of the Arizona Imaging and Microanalysis Society held in Flagstaff, Ariz., in April 2008. The poster—A SEM-Structural Chemical Analyzer Study of Multi-walled Carbon Nanotubes Grown by Chemical Vapor Deposition—presented research done in collaboration with Motorola Labs in Tempe, Ariz.

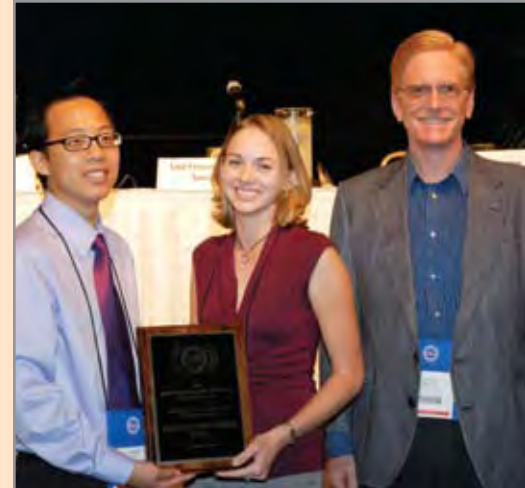
Lifetime Achievement Award for ECE Professor

The International Coordination-group for Laser Atmospheric Studies honored John

Reagan in June 2008 with a Lifetime Achievement Award. Reagan, professor

emeritus in the ECE department, received the award at the International Laser Radar Conference in Boulder, Colo.

Laser Beam—Professor John Reagan accepts his lifetime achievement award.



Courtesy of Michael Marcellin

Paper Assets—The first place undergraduate student paper award is accepted by (left to right) Wei-Ren Ng, Kristin Jagiello and Michael Marcellin.

Marcellin's Team Wins 1st and 2nd Best Papers

Professor Michael Marcellin gave the keynote speech at the October 2008 International Telemetry Conference in San Diego, Calif.

While Marcellin entertained conference attendees with his keynote luncheon talk about digital cinema—An Overview of Digital Cinema: Are There Answers for Telemetry?—several of his students were busy sweeping up first and second place undergraduate student paper awards.

First place went to Kristin Jagiello, Zafer Aydin, Wei-Ren Ng (students), William Ryan, Michael Marcellin and Ali Bilgin (advisors) for their paper, Joint JPEG2000/LDPC Code System Design for Image Telemetry.

Second place went to Andrea Chaves, Bruno Mayoral, Hyun-Jin Park, Mark Tsang, Sean Tunell (students), Michael Marcellin and Hao Xin (advisors) for their paper, Wireless Sensor Networks: A Grocery Store Application.



Aerospace Alum Wins Shaping the Future Award

TMAL awards recognize collaboration between engineering and business

Chris Lewicki, manager of the Phoenix Mars Mission, won a Shaping the Future Award at the 2008 Technology and Management Awards Luncheon (TMAL) held in October at the Arizona Biltmore Resort & Spa in Phoenix, Ariz.

The TMAL awards were established 10 years ago to recognize the competitive advantage resulting from collaboration between engineering and business, and to create awareness in the business community of the collaborative courses and student-focused programs being pursued by the College of Engineering and the Eller College of Management.

New this year was the Shaping the Future Award, which recognizes the contributions of engineers and business executives whose work today will have a profound effect on future societies.

The awards were presented by UA President Robert N. Shelton; Paul Portney, dean of the UA Eller College of Management; and Thomas Peterson, dean of the UA College of Engineering.

The other Shaping the Future Award went to Roberto Guerrieri and Alicia Coleman, the founder and vice president, respectively, of Incentive Logic. Both received their master's degrees in business administration from Eller. In 2007 and 2008, Incentive Logic was named on the *Inc.* 5000 list as one of the fastest growing companies in America.

The College of Engineering Lifetime Achievement Award went to Douglas Silver, who got his master's degree in economic geology from UA in 1980. Silver began his career as an exploration



Chris Lewicki



Doug Silver

geologist with the Anaconda Copper Company. In 1986, he created a private consulting company, Balfour Holdings Inc., and spent more than 17 years advising clients on global mineral appraisals, acquisitions and mergers and strategic planning.

Silver suspended his consulting practice in 2003 to found International Royalty Corporation (IRC), a global

mineral royalty company of which he is chairman and chief executive officer. IRC was the largest mining-related public offering on the Toronto Stock Exchange in 2005 and has since been listed on the American Stock Exchange. IRC's revenue has grown from \$400,000 in 2005 to \$50 million in 2007.

The Phoenix Mars Mission, the first mission in NASA's Scout program, put the Phoenix Mars Lander on Martian soil on Sunday, May 25, 2008. Lewicki graduated from The University of Arizona's College of Engineering in 1997 with a bachelor's degree in aerospace engineering, and again in 2000 with a master's degree in the same subject. In 2001, when he was a senior flight systems engineer at the California Institute of Technology's Jet Propulsion Laboratory in Pasadena, Calif., Lewicki became flight director for NASA's Mars Exploration Rovers Mission.

Five years after landing on Mars in January 2004, the two rovers—Spirit and Opportunity—are still going strong. At that time, Lewicki likened the experience of landing a rover to driving a sports car, but modestly asserted that flight engineers were “valets who bring it around to the front and give the keys to the science team.”

The Eller College Lifetime Achievement Award went to Jay Geldmacher, under whose leadership Emerson Network Power's Embedded Computing group has grown from \$300 million to \$2 billion in revenue, and is one of the world leaders of power conversion and computing products.

Geldmacher attended the UA on a full basketball scholarship. He holds a bachelor's degree in business administration from Eller College, and a master's in business administration from the University of Chicago.

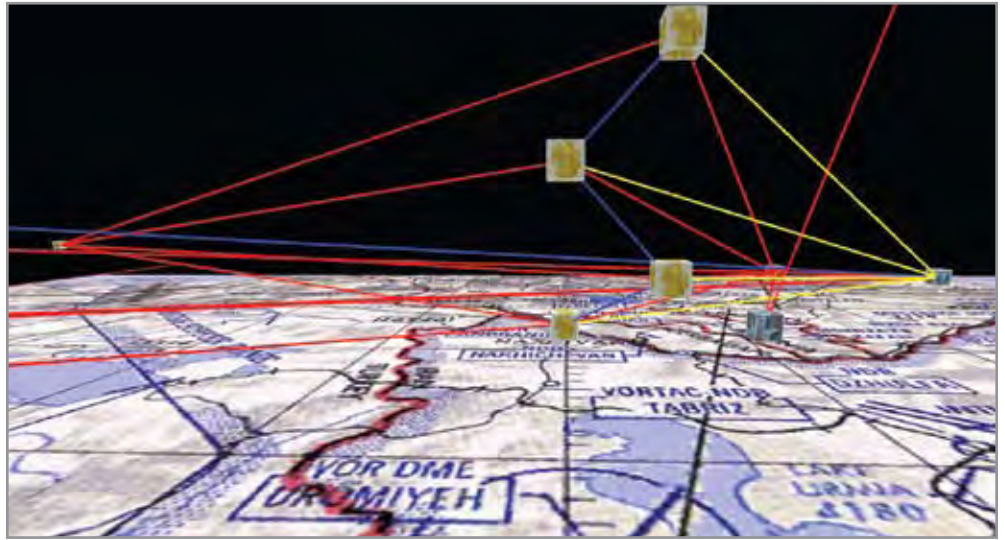
Army Funds Research into Warfare Computer Modeling

The U.S. Army has awarded another \$2 million to Professor Jerzy Rozenblit

Ae FULL STORY Number 30 to fund phase 2 of a project to design intelligent software that can analyze the behavior and customs of political and cultural groups.

In 2007, the Army awarded Rozenblit \$2 million to fund the recently completed phase 1 of the Asymmetric Threat Response and Analysis Project, known as ATRAP. Rozenblit holds the Raymond J. Oglethorpe endowed chair in electrical and computer engineering, and is head of that department.

In the context of armed conflict, “asymmetric” describes opposing forces that differ in terms of size, strength, resources, tactics, armaments, strategy, technology or motivation. Forging peace between such disparate belligerents has confounded negotiators for centuries.



College of Engineering/ECE

Virtual Peacemaker—A screen image from the ATRAP system shows how various relationships are rendered in the three-dimensional “thoughtspace.”

The ATRAP software will enable intelligence analysts to build up three-dimensional maps of interactions between conflicting groups. By mapping

behavior, relationships, resources, events and timelines, analysts hope to be able to predict, and therefore prevent, eruptions of violence.

Poulton is Director of New Minerals Institute

Arizona is sitting on a gold mine, figuratively speaking. Literally, this

Ae FULL STORY Number 18 mineral-rich state is sitting on billions of tons of ore, including a copper ore body estimated at 1.34 billion tons, enough to meet 20 percent of expected U.S. demand for copper during the next 50 years.

“We haven’t even scratched the surface,” said Professor Mary Poulton, head of the UA’s Department of Mining and Geological Engineering (MGE). “This is a very well endowed state. And it is primary wealth, it is new money that enters the economy.”

Poulton is director of the newly established Lowell Institute for Mineral Resources, a collaborative push by



College of Engineering/Pete Brown

Mine Host—The American Institute of Mining, Metallurgical, and Petroleum Engineers recently presented the Mineral Industry Education Award to Mary Poulton.

Science Foundation Arizona (SFAz), the mining industry and Arizona’s universities, led by UA, to found a global center of mining excellence. “It’s

one of the most exciting things going on in mining research in this country,” said Poulton. “We think this new initiative is going to have tremendous impact. For the first time, we will be able to create an interdisciplinary center that really can tackle the breadth of issues related to mineral resources.”

The concept of the institute arose in 2004 at an MGE industry leadership board meeting. “Several industry people really felt that the depth and breadth of talent at this university was unique in the world, and that we needed to capture that in some package,” said Poulton.

SFAz and IMR’s industry partners are funding the institute to the tune of \$17.7 million spread over the next four years. The institute is named after mining engineering alum and legendary mining engineer, J. David Lowell.

STUDENT PROJECTS

Baja Race Team Goes From Strength to Strength

The UA Baja Racing team held an orientation session in August 2008, followed by a welcome-back barbecue so that newcomers could meet the returning team.

As this issue went to press, the team was road-testing the brand new 2009 vehicle, which will see some real race action June 2009 in the Baja SAE Collegiate Design Series at the MGA Research Facilities in Burlington, Wis.



The diversity of the membership is its strength, said Baja team leader Andrew Smock, a mechanical engineering senior. "Every member brings unique qualities to the team along with unparalleled ambition for success, both in school and on the dirt," Smock said. "On their own they are motivated students from different educational backgrounds with the desire to accelerate their professional and mechanical knowledge. Together they are an unstoppable force more commonly known as UA Baja Racing."

In its last race, the 2008 vehicle was one of 31 out of the entire field to finish the endurance race and one of even fewer vehicles to complete all dynamic events. Placing 33rd overall, the UA Baja team accomplished an unprecedented feat by jumping roughly 50 placements in one year. "Couple that with unparalleled recruitment and retention rates along with community activism," said Smock, "and the result is the beginnings of a program that will continue to raise the bar year after year."



UA Foundation/David Allen



College of Engineering/ARC

Cat Flight—Wildcat 8 makes a smooth landing during IARC.

UA Aerial Robotics Team Awarded Prize Money at IARC

The UA Aerial Robotics Club (ARC) was awarded \$1,200 prize money Aug. 1 at the 2008 International Aerial Robotics Competition (IARC) awards banquet in Fort Benning, Ga. The team will use the award to cover the cost of entering this year's competition.



The banquet was held to thank sponsors and those who helped make the event a reality, and to recognize the achievements of competitors.

Although the UA team did not get the chance to demonstrate the full range of its system's capabilities, it is looking forward to next year's competition. "We still had a great time at the event and we gained a lot of valuable experience from it," said a team member on the ARC blog. "The team seems to be stronger than ever and we are all incredibly excited about next year's event."

It was confirmed at the awards banquet that 2009's IARC will be scaled down to an indoor competition. This will require the UA team develop a completely new platform because its current air vehicles are not suitable for indoor flight.

A major challenge for the UA team will be securing funding to redesign its systems. The team's current sponsors include Raytheon, Advanced Ceramics Research, Lockheed Martin, Cloud Cap Technology and TacGeo.

A team member explained: "The last few years have been relatively inexpensive for us as a club because we already had most of the expensive parts that we needed from previous years. Now that we have to scale down drastically, none of our existing electronics or airframes are suitable."

The team thanked its sponsors on the ARC blog: "[We] want to thank everyone that helped support us this season ... We still had a great year and learned a lot. This coming year will be the best one yet!"

Students Will Study Micro- and Nanosystems in Eastern Europe

The UA has received a grant for 12 mechanical engineering students to conduct micro- and nanotechnology research at technical universities in Hungary and Slovakia.

During each of the next four years, three UA and three NMSU students will get a \$5,000 stipend to cover living costs in Europe for one semester. The \$180,000 grant was awarded jointly by the U.S. Department of Education and the European Commission's Atlantis program.

It will support a four-year project initiated by the aerospace and mechanical engineering departments at The University of Arizona and New Mexico State University, Budapest University of Technology and Economics (BME) in Hungary, and Slovak University of Technology in Bratislava (STUBA).

Similarly, during the next four years 12 students each from BME and STUBA will each receive €5,000 to cover their U.S. living costs for a semester. The first students joined the program in the spring 2009 semester.

Hispanic Engineer Group Gets Technology Awareness Grant

The UA student chapter of the Society of Hispanic Professional Engineers received a grant in 2008 to conduct La Familia Technology Awareness Programs. This is the eighth year the UA chapter has organized the La Familia event.

The annual La Familia Technology Awareness Week was celebrated in



College of Engineering/Matt Brailey

Small World—Professor Enikov in the Advanced Micro and Nanosystems Lab.

In the College of Engineering, the prime mover behind the exchange program is BME alumnus Eniko Enikov, associate professor in the Department of Aerospace and Mechanical Engineering, and director of the Advanced Micro and Nanosystems Laboratory. Enikov earned his master's degree in mechanical engineering from BME in 1993.

"There are similarities in our research," said Enikov, comparing the U.S. and European agendas. "But historically,

research in Eastern Europe is more theoretical, so we are trying to forge a complementary research program."

"There is a growing trend in academic internationalization," said Enikov. "Students need to be able to compete globally. Industry already does." Evidence is mounting that such programs give students an advantage: "Students will be more marketable if they have foreign experience," said Enikov.

October with help from community organizations, schools, clubs, and corporations throughout the country.

The chapter received the grant from Career Communications Group, founder of the La Familia Network, to hold activities in Tucson. In addition to the grant, the chapter received technology teaching tools.

The theme of the event was "breaking the digital divide"—that is, bridging the gap between the younger generation that has grown up taking computer technology for granted and the older generation, which is more likely to be unfamiliar with computers. The event was sponsored by BAE Systems and IBM, and gave 130 participants an opportunity to learn how to use a computer.

Solar Racers Ride to Success

Against a strong international field of well-financed teams, the UA Solar Racing Team covered 2,400 miles from Texas to Alberta

The University of Arizona solar racing team headed to Texas July 4, 2008, for the American Solar Challenge, confident it had fixed the problems that scuppered its chances in 2005.

Nineteen days later, against tremendous odds, the team finished in tenth place.

The race is a competition to design, build and race solar-powered cars. It aims to promote greater understanding of the benefits and promise of solar energy technology, to inspire young people to follow careers in science and engineering, and to enable students to develop and demonstrate their technical and creative abilities.

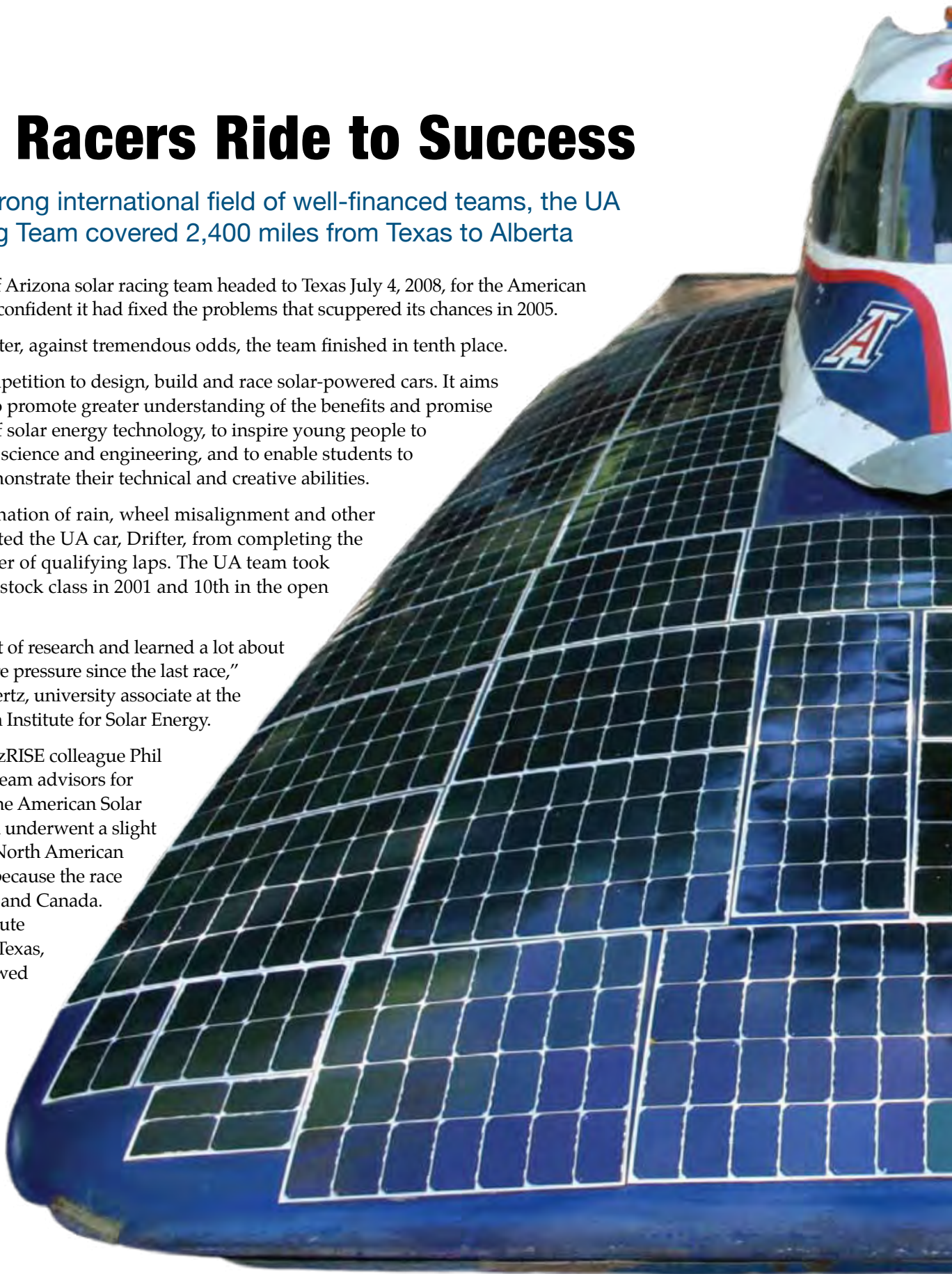


In 2005, a combination of rain, wheel misalignment and other gremlins prevented the UA car, Drifter, from completing the minimum number of qualifying laps. The UA team took first place in the stock class in 2001 and 10th in the open class in 2003.

“We’ve done a lot of research and learned a lot about alignment and tire pressure since the last race,” said Harland Goertz, university associate at the Arizona Research Institute for Solar Energy.

Goertz and his AzRISE colleague Phil Davis were race team advisors for UA’s entry into the American Solar Challenge, which underwent a slight name change to North American Solar Challenge because the race spanned the U.S. and Canada.

The 2,400-mile route started in Plano, Texas, and mainly followed U.S. Highway 75 and Canadian Highway 1 to Calgary, Alberta.





“No matter where we go, people are excited that somebody is doing something about solar power.”

In March 2008, the race team consisted of four students plus Goertz and Davis. Drifter was in pieces, funds were short and support had waned. Three months later, Drifter 2.0 was performing to race standards during trials, the crew of 16 was ready to take to the road with a fleet of support vehicles, and the team had the support of AzRISE and the College of Engineering. Team confidence was high despite formidable competition from an experienced international field that included the United States, Germany, England and Canada.

Drifter 2.0 is registered with the Arizona Department of Transportation as a convertible, and is the state’s first street-legal solar-powered car.

Goertz also cited community support as an important reason for the team’s race readiness. “The community is fascinated,” he said. “No matter where we go, people are excited that somebody is doing something about solar power.” That support translated into a local RV company helping prepare the truck and trailer for the journey, and a high-tech battery company pitching in to help iron out some of the power supply problems that bedeviled the original Drifter in 2005.

Regardless of who got to the checkered flag first, the race made quite a statement at a time of record-high energy costs: These cars did not consume a single drop of gasoline on their 2,400-mile journey. They were instead powered by energy that will be available for a billion years from a source that is clean, reliable, cheap and sustainable — the sun.

Thank You!

These pages list the companies, organizations and individuals who have contributed to the College of Engineering during fiscal year 2007-2008.

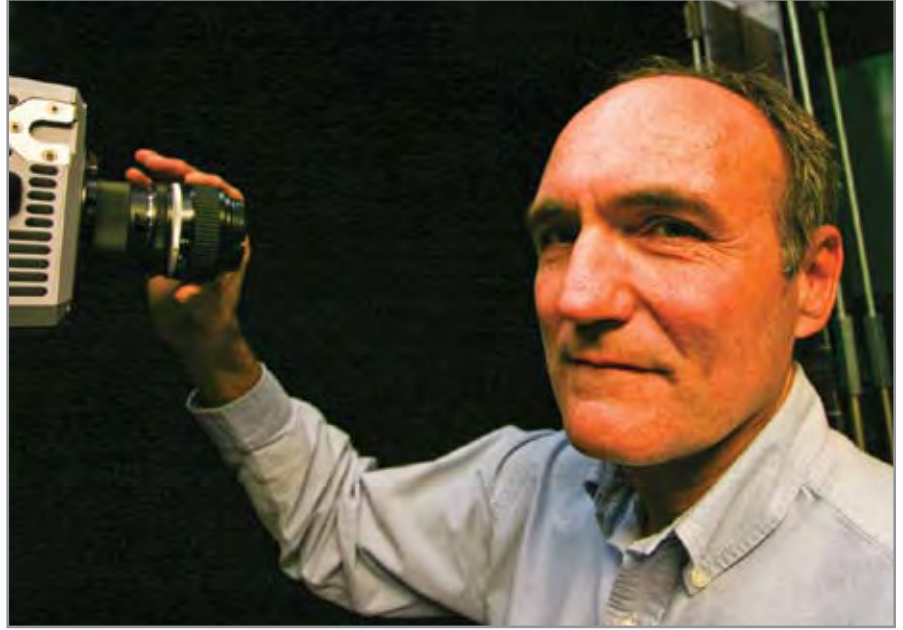
Their support is vital in providing scholarships, funding programs and supporting research.

Without this help, some students would not be able to complete their education. Many other students would not have access to resources that give UA Engineering a margin of excellence for educating tomorrow's engineering leaders.

We want to take this opportunity to say "thank you" from the students and faculty who have benefited so much from this generous support.

We have made every effort to list all those who contributed to the college and sincerely apologize if we have missed anyone.

If you donated to UA Engineering during 2007-2008 and are not on this list, please let us know, and we will list your name in the next issue of *Arizona Engineer*.



College of Engineering/Pete Brown

Jeffrey Jacobs is the new holder of the Elwin G. Wood Distinguished Professorship, which was established by Loren M. and Sally Wood in memory of Loren's father, Elwin G. Wood. The professorship recognizes a full professor in the Department of Aerospace and Mechanical Engineering for exemplary service in teaching or research. Loren M. Wood received a bachelor's degree in mechanical engineering from UA in 1952, and an MBA from Harvard in 1958.

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College of Engineering/Pete Brown

Garland Speight was selected as the inaugural da Vinci Circle scholar and awarded a scholarship. He is a mechanical engineering junior and a member of the Naval Reserve Officer Training Corps at UA. Civil engineering junior Alicia Forrester and optical sciences and engineering sophomore Sunglin Wang received da Vinci scholar honorable mentions.

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College of Engineering

Breakfast of Champions—The Maricopa County Engineering Council, The University of Arizona Alumni Association and the College of Engineering hosted the 24th Annual St. Patrick's Breakfast March 17 at the University Club of Phoenix. Pictured with Development Director Beth Weaver (center) are council members William Waggoner (left) and Oscar Lyon.

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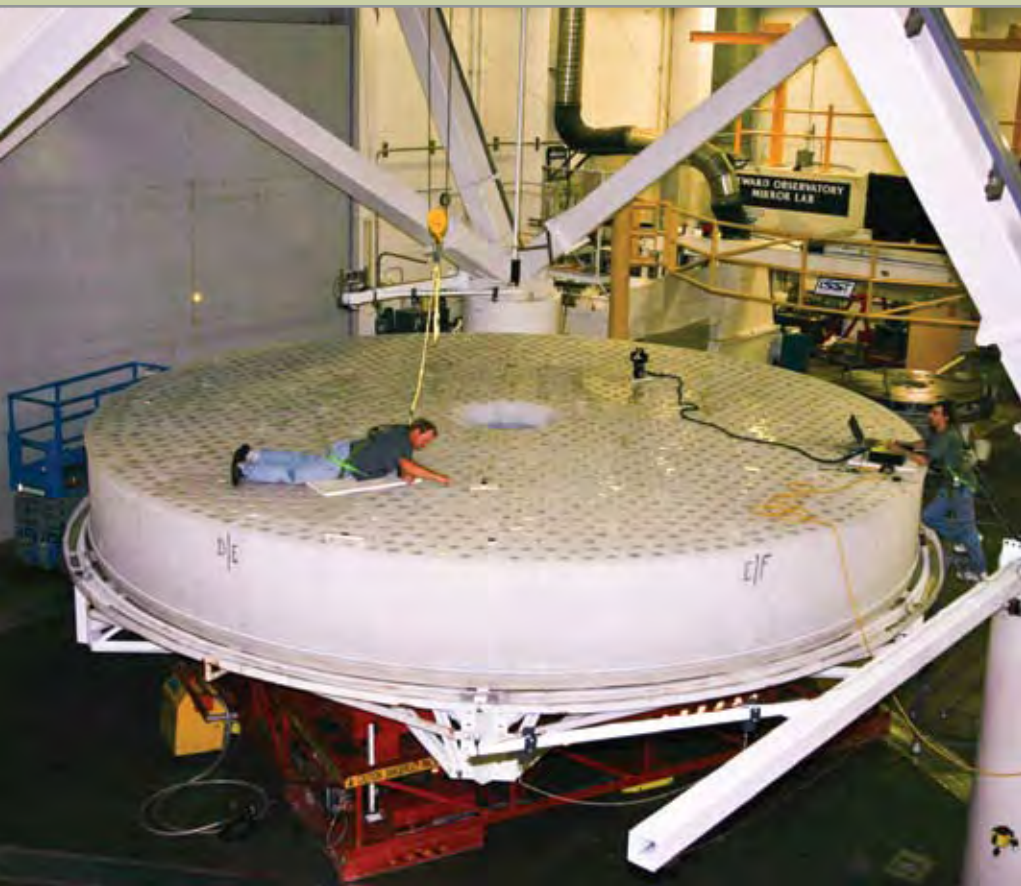
Top Team—The University of Arizona Alumni Association, the College of Engineering and The University of Arizona Foundation teamed up to organize a special alumni event at La Cima Club in Irving, Texas, in October 2008. Special guests were UA President Robert Shelton and Fluor Corporation CEO Alan Boeckmann. Pictured are (left to right) Jim Liston, Lisa Boeckmann, Alan Boeckmann and Tom Peterson.

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College of Engineering/Pete Brown

Mirror Image—da Vinci Circle members were treated to a tour of the world-renowned Steward Observatory Mirror Lab in March 2009. The photo shows technicians inspecting a newly cast mirror. The behind-the-scenes tour looked at the optical technology and revolutionary spin-casting processes involved in making giant telescope mirrors. The Mirror Lab is the only place in the world where these giant monolithic mirrors are cast.

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 Joyce C. Robinson
 David G. Robinson
 Rocky Mountain Coal Inst.
 William and Marilyn Rodman
 Toni L. Rogero

New Scholarships

The UA College of Engineering has announced several new scholarships, including the **Thomas W. Peterson Scholarship**, which was established by friends and family of Tom Peterson, dean of the UA College of Engineering from 1998 to 2008, and current head of the engineering directorate at the National Science Foundation. To be eligible, students must be enrolled full-time in the College and serve as student ambassadors.

August V. Hardt Scholarship

August V. Hardt was a longtime supporter of UA. He graduated from UA in 1963 with a bachelor's degree in civil engineering, and his family and friends established this scholarship. Hardt was born and grew up in Globe, Ariz., and lived all his life in Arizona. After graduating, he joined the State Highway Department, which would later become the Arizona Department of Transportation, as an engineer-in-training. He worked there for more than 33 years until he retired in 1996, when he was state operations engineer.



August V. Hardt

Scholarship recipients must be full-time undergraduate or graduate students in civil engineering or engineering math. First preference will be given to students from Globe High School. Second preference will be given to students from Gila County or rural Arizona. If no students meet these preferences, the scholarship can be awarded to a student who meets the other criteria. The scholarship is renewable for a maximum of four years.

S. Jack McDuff Scholarship

S. Jack McDuff graduated from UA in 1951 with a bachelor's degree in metallurgical engineering. He is a longtime supporter of the UA and is highly active in several UA organizations, including the College of Engineering's da Vinci Circle board, the UA Alumni Association, and the Sigma Chi Fraternity. The S. Jack McDuff Scholarship is awarded to

an outstanding engineering senior who demonstrates excellence in scholarship, character and promise. Eligible students may be enrolled in any engineering discipline except chemical engineering, geological engineering, materials science engineering and mining engineering, which are represented by the Thomas G. Chapman Scholarship and Fellowship.

John Tipton Scholarship in Engineering
 The John Tipton Scholarship in Engineering has been established to support or recruit outstanding students. To be eligible, students must be undergraduates enrolled in the College of Engineering who are U.S. citizens maintaining a minimum 3.0 GPA, and who can demonstrate a need for financial assistance. Incoming freshmen are eligible to compete for the award if they have a minimum 3.4 GPA from their high schools. Candidates must qualify as need-based students according to the Free Application for Federal Student Aid program standards. At the discretion of the College, one scholarship may be offered to recruit an outstanding scholar even if there is not financial need.

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Bane Vasić Named 2008 da Vinci Fellow



Bane Vasić

Bane Vasić was named the 2008 da Vinci Fellow. He is a professor of electrical engineering and mathematics in the Department of Electrical and Computer Engineering. The fellowship is sponsored by the College's giving society, the da Vinci Circle.

Fellows are selected for substantial distinguished and sustained contributions to teaching, research and service. A new fellow is named each year, and fellowships last two years. Fellows receive \$10,000 during the two-year span of the appointment.

Vasić is an alumnus of the University of Niš in Serbia, where he got his engineering diploma, master's degree

and doctorate in electrical engineering. "I go back to Niš every year to teach a short course at the university and visit my parents and my brother, Bata, who teaches computer animation," said Vasić.

Vasić has been at UA since 2000. Before that he was at Bell Labs, where he developed an error-correction algorithm that is in widespread use in modern hard drives.

"I will use the fellowship money on supporting my students and myself to go to conferences," Vasić said. "I have a really good research group, and sending my students to conferences is not only business, it is also a reward for their hard work."



College of Engineering/Marcie Fritz-Reichenbacher

da Vinci Members Get Weather Advisory

In September, da Vinci Circle members and guests got a behind-the-scenes tour of KOLD News 13, hosted by chief meteorologist Chuck George, who is an engineering alum and da Vinci Circle member. The event included a tour of the weather center, news center, sales and advertising department and control room. Guests also watched a live news broadcast and took part in a chroma key demonstration. In the photo, George (left) is explaining how the chroma key technique works when he is doing his weather forecast.

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 Scott R. Rudin
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Hussein S. Saly
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 Richard E. Schilk
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 Darrell J. Smith
 Charles H. Smith
 Michael L. Smith
 Mona E. Smith
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 Nancy F. Smith
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 Ronald T. Smith
 Bruce D. Smith

Marie Smith
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 Robert and Donna Spenser
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 Larry and Sandra Stephens
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 Branda B. Wilhoite
 William and Elizabeth Wilkening
 Lisa Willey
 Mary L. Williams
 Ronald C. Williams
 Elizabeth N. Williams
 Jennifer L. Williams

Brent Hiskey is First Cimetta Chair



Brent Hiskey

Brent Hiskey, associate dean and professor of materials science and engineering, is the inaugural recipient of the Cimetta Chair in the College of Engineering. Professor Hiskey received this appointment in recognition of the outstanding contributions he has made in the field of metallurgical engineering and materials science and engineering.

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 Pamela K. Williams
 Douglas L. Williams
 James M. Willingham
 Matthew D. Wilson
 Phyllis F. Wilson
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 Jeffrey and Kathleen Zubele
 Keith and Helga Zwickl

Earthquake Engineering

CONTINUED FROM PAGE 1

which will protect buildings—and their occupants—from earthquakes.

The research project, headed by Fleischman, has been conducted



jointly by The University of Arizona, the University of California at San Diego and Lehigh University. The research was funded by the Precast/Prestressed Concrete Institute, the National Science Foundation's Network for Earthquake Engineering Simulation and Grant Opportunities for Academic Liaison with Industry, and the Charles Pankow Foundation. Fleischman recently secured funding to proceed with the second phase of the research project.

The project involved building a 500-ton concrete parking garage and then subjecting it to a magnitude 7 earthquake

while measuring the stresses that almost reduced it to rubble.

The million-dollar test required the construction of a 3-story, half-scale precast concrete structure on a giant shake table at UC San Diego's Englekirk Structural Engineering Center. About 600 instruments throughout the structure measured its responses to fifteen 20-second quakes simulated by the shake table.

Many of the structures that failed in the Northridge earthquake were built using precast concrete. This is a very economical construction technique because the component slabs are made offsite. "Quality is much easier to control, and therefore high," says Fleischman. "And the precast pieces last a lot longer than concrete that is cast in situ at a construction site."

Precast concrete's strength derives from prestressing. We've all passed

construction sites and seen steel rebar sticking out of unfinished concrete structures. Prestressing involves stretching this steel in a mold, or bed, and then pouring the concrete to embed it. Once the concrete is dry, the stretched steel is cut. "It's like a big rubber band," says Fleischman. "The steel tries to shorten and it squeezes the concrete."

These precast and prestressed slabs are transported to the construction site by truck and dropped into a concrete framework by crane. The slabs sit on ledges in the framework, and are usually welded to adjacent slabs where the steel protrudes. These joints are weak points in the structure, and can come apart like a zipper during an earthquake. "When building a precast structure in California, you have to actually pour cast-in-place concrete on top of it to hold it together," says Fleischman. "And that kills the economic advantage."



Courtesy of Darlene Danehy

All Stars—Danehy (#21) and Hanzal (#3) were selected for the all-tournament team from the 38 teams participating in the USAV national championship. The players were (back row, left to right) Suzan Koch, Christina Thompson and Orianna Leota; and (front row, left to right) Rhea Frondozo, Darlene Danehy, Anni Siebenmorgen and Alesia Hanzal.

Darlene Danehy BS/CE 2004

Danehy was a member of the UA's club volleyball team during her time at the UA, and was a captain for 3 years. She played volleyball through graduate school at Cornell University and has continued playing since graduating. Her USA Volleyball team, the Killer Beez, won several tournaments during the 2008 season, including the Arizona regional championship. The team went on to compete at the USAV national championship in Atlanta, Ga., in May 2008. The Killer Beez won the national championship, going 10-0 over four days. Danehy's teammates included UA alumni Rhea Frondozo (MS 2006), Alesia Hanzal (MA 2004, PhD 2008) and Christina Thompson (2007).

A.H. (Hank) Giesecke BS/AE 1962

Giesecke went on to get a master's degree in aerospace engineering from USC and a master's in business administration from UCLA. After some time in the space

program, he spent many years in the corporate world. In 1996 he began Reach Out Ministries to organize and support agricultural projects in Burundi and Malawi, Africa, with the goals of improving diet, enriching

Julia Gay (Thorson) BS/CE 1986

Thorson is currently a project manager with Heery International Inc. in Tucson, Ariz. Heery is an international architectural, engineering, construction management, facilities management, interior design and project management company. Following graduation from UA, Thorson worked at Davis Monthan Air Force Base in Tucson for the Army Corps of Engineers, and in Fort Huachuca, Ariz., for Sundt Construction Company.

After earning her bachelor's degree in civil engineering, Thorson got an interior design degree and became proprietor of a full-service design studio called Comfort Zones Interiors for 15 years. She has installed work internationally and locally, and has had her work published in local newspapers and magazines. In 2003 and 2005, the American Society of Interior Designers selected her to participate in its Designer Show House.

Thorson lives in Tucson and has three daughters—one at UA and two in high



Julia Thorson

school. Her favorite activities are sharing time with her daughters, and traveling, cycling, hiking and attending cultural events. If you would like to contact her, you can do so at jthorson3@cox.net.

Garrett Smith BS/ABE 2005

Smith is currently a doctoral student in the Department of Bioengineering at the University of California in San Diego. In 2008, the team he founded at UCSD's Jacobs School of Engineering won first prize in a business plan competition organized at the University of Southern California. The team's winning entry—Advances in Accelerating Bone Healing and Implant

soil, and providing the means for small business development. These programs emphasized growing soybeans for protein, intensive gardening, composting, irrigations systems, and small business funding

and training. When not consulting on project management, Giesecke gives talks around the world—at schools, churches, seminars, camps and prisons—on humanism and religion, and on the intelligent design versus evolution debate.

Performance—earned them an award of \$78,000, which they intend to spend on dental implant research and prototyping.

The project uses nanotechnology to speed bone healing in patients with implants made of titanium or other metal alloys. Possible clinical applications include bone screws, dental implants, spinal implants, and titanium components for joint replacements.

Smith's research also got an award at the UCSD Jacobs School of Engineering 28th

Annual Research Expo on Feb. 19. Of the 240 posters and abstracts entered, he won Bioengineering Best Poster with his entry, Titanium Dioxide Nanotubes Enhance Bone Bonding *In Vivo*.

Smith has been traveling extensively and spent a year in Sweden doing biomedical research. He has given guest lectures on his research in Denmark, Norway, Portugal and Holland. "I really have many professors at UA who encouraged me to be both an engineer and entrepreneur," he said.



Courtesy of UC San Diego Jacobs School of Engineering

Check, Please—Garrett Smith founded the team that won first place and \$78,000 in a UCSD business plan competition.

In Memoriam

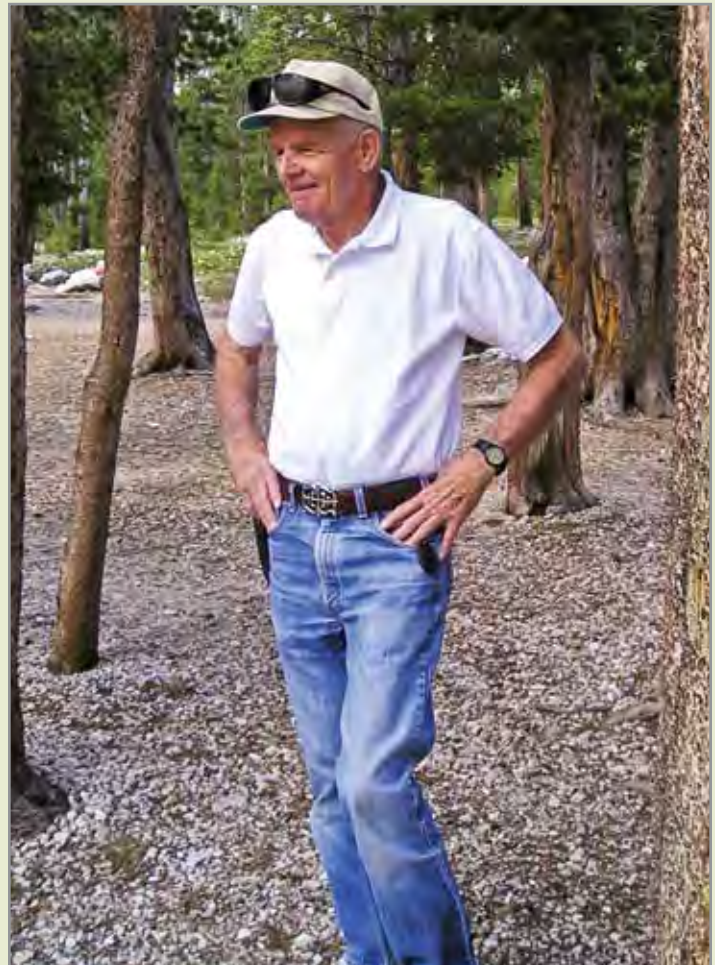
Thomas E. Russell
BS/CE 1967

Russell died July 16, 2008. He was born in Phoenix, Ariz., in 1930, and served four years in the U.S. Navy aboard aircraft carriers USS Essex and USS Valley Forge during the Korean War. He graduated at age 37, on the same night as his 20th high school reunion.

Russell became a registered professional engineer in June 1973. During his federal career, he worked for the Prescott, Sierra, Cleveland and Clearwater national forests. In 1983, he retired as forest engineer in Orofino, Idaho. Russell continued his consulting work in Idaho and Colorado, and was a registered engineer in Arizona, California, Colorado and Idaho, and a licensed land surveyor in Arizona.

Russell enjoyed hunting, skiing, tennis, square dancing and silversmithing. He was also an accomplished woodworker, and made many pieces of furniture for the home he shared with his wife Sharon, and for close family members. He is survived by his wife, four children, ten grandchildren and one great granddaughter.

A fund in his memory has been set up for the children's Awana program at the Verde Baptist Church, 102 South Willard Street, Cottonwood, AZ 86326.



Courtesy of Sharon Russell



ALUMNI ECHOES

Devon Campbell BS/ME 1997, MS/ME 1999

Campbell has been named one of the top 100 notable contributors to the medical device and diagnostics industry.

These top 100 industry names were selected by the staff and readers

of *Medical Device & Diagnostic Industry*, a monthly magazine for manufacturers of medical devices and *in vitro* diagnostic products, and published in the June 2008 edition of *MD&DI*.

Campbell is senior manager, product development, in the primary staining business unit at Ventana Medical Systems in Tucson, Ariz. He has engineered numerous products at Ventana, including two gold medal winners in the Medical Design Excellence Awards organized by the publisher of *MD&DI*. The award-winning products were an automated histology slide preparation



Devon Campbell

system in 2007, and an automated histology staining system in 2001. Campbell's award-winning products are not the only reason he was included in the industry's top 100. "I was selected for a number of reasons," Campbell said. "Including community outreach to attract elementary school kids to science by giving larger-than-life physics demos. We even build a 5-foot-diameter hovercraft in one of the demos."

"I feel I have a responsibility to support the College of Engineering and specifically the AME department, both of which offered me significant support during my bachelor's and master's degrees. I want to be able to help today's students have that edge, too."

SEND US AN E-MAIL!

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

Please e-mail us (200 words or less) and include the following:

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

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

Please send your e-mail to:

pnb@email.arizona.edu