

Ed Stiles

Leslie Ortiz, a master's student in Computer Engineering, adjusts Gimli, one of the robots in Charles Higgins's Neuromorphic Vision and Robotic Systems Laboratory. Gimli mimics insect vision and is designed to follow a moving object. It's built on the chassis of a radio-controlled model car.

Mixing Biology and Electronics to Create Robotic Vision

Robots are a long way from being as sophisticated as the movies would have you believe.

Sure, they can crush humans at chess. But they can't beat us at soccer — half the time they can't even recognize the soccer ball — or defeat us in single combat and walk away.

"We don't have robots that can physically compete with humans in any way," says Charles Higgins, an assistant professor of Electrical and Computer Engineering.

However, Higgins is working to change that. He hopes to give sight to robots along with the ability to react to what they see.

"Right now, robots in general are just pitiful in terms of visual interac-

tion," he said. True, a few can see in some sense, but they aren't mobile. These vision systems are connected to large computers, which precludes their use in small, mobile robots.

Outside of these few vision-only systems, today's robots see very little. "Wouldn't it be nice to have a robot that could actually see you and interact with you visually?" Higgins asks. "You could wave at it or smile at it. You could make a face gesture. It would be wonderful to interact with robots in the same way that we interact with humans."

If Higgins has his way, at least some of the first steps toward that goal will be achieved in the next ten

to 20 years through neuromorphic engineering, a discipline that combines biology and electronics.

Higgins and his students are developing an airborne visual navigation system by creating electronic clones of insect vision processing systems in analog integrated circuits. The circuits create insect-like self-motion estimation, obstacle avoidance, target tracking and other visual behaviors on two model blimps.

Higgins is well qualified to combine the radically different disciplines of biology and electronics. In addition to his faculty position in ECE, he's also

Continued on Page 13



© UA/Robert Walker

Engineering in a Global Context

Deans' Institute studies globalization of engineering education

In April, Tucson was the location for the 2005 Engineering Deans' Institute. This annual meeting focused this year on issues relating to the globalization of engineering education, and I had the privilege of serving as program chair.

It was an opportunity to hear from numerous experts, from the United States and abroad, about the dramatic changes that are taking place in engineering education worldwide.

Three things are happening within the engineering profession that are significantly impacting the discipline and the practice of engineering.

Changes in Education

First, certain segments of engineering, long thought to be the exclusive domain of engineers educated in the United States, are being outsourced to countries all over the world and undertaken by engineers educated in those countries.

Second, as it becomes more and more difficult for foreign students to gain entry into the United States (due to Homeland Security restrictions), graduate engineering programs in Europe, Australia, Canada, and many other places are aggressively recruiting those students, even if it takes substantial changes in each country's basic educational structure to do so.

Third, engineering colleges in the United States are realizing, thankfully, that a well-rounded engineering education must include an appreciation for the globalization that is taking place and, if possible, must offer students an opportunity to study engineering abroad.

Europeans Convert Programs

Engineering education programs throughout Europe are converting to the structure most commonly found in the United States. Outstanding engineering schools in Germany,

France, Italy, and many other European nations are moving to the BS/MS/PhD programs typical of those found in the United States.

Students from India, China, South Korea, and other countries, who once flocked to the United States for their engineering studies, are now studying engineering in these other countries. And, rather than returning to their home countries, they are remaining after graduation, further strengthening the high-tech economic vitality of these countries.

Studying Abroad

Thankfully, engineering at UA has progressively pursued opportunities for our own students to study engineering abroad. During the past two years, for example, our students have studied engineering for one or more semesters in Turkey, Netherlands, Denmark, Japan, Hong Kong, France, Spain, Wales and Singapore, just to name a few locations. Without exception, these students have returned to the States with a greater appreciation for global engineering opportunities and for the challenges that they will face as they graduate into this newly globalized economy.

UA's Expanded Program

Engineering at UA is proud of the expanded educational opportunities it is providing for its students. Over the past six to eight years, we have focused on providing business education opportunities to engineering students, a broader exposure to the humanities, and now, most recently, an opportunity for a global engineering education experience.

By offering these expanded educational opportunities, we're giving our graduates a skill set that makes them particularly valuable to industry.

As always, I welcome your comments regarding these issues and any others relating to our efforts here at UA to provide the best possible engineering education for our students.

Using 'More info'

Go to our web site for more in-depth coverage of Arizona Engineer stories

At the end of several stories in this issue of *Arizona Engineer*, you'll find a word or phrase that follows the heading "More info." You can use this keyword or phrase to search for the longer version of that story on our engineering news pages at <http://uanews.org/engineering>.

Just type the word or phrase into the "Engineering Article Finder" box at the top left of the web page and click on "search."

Space is limited in this print edition of the magazine. But the web pages give us space for more in-depth coverage of the stories that appear here, as well as room for additional stories that wouldn't fit in the magazine.

The web site also has up-to-the-minute news about the UA College of Engineering. It includes the latest on student projects, research, college events, and other activities.

To read more about science and technology at The University of Arizona, go to the SCI/TECH column at <http://uanews.org>.

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Engineer

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UA solar car on TV

The Arizona Solar Racing Team has gotten lots of TV exposure recently, with coverage by Discovery Channel Canada's *Daily Planet* program and Australia's *Eco Trekker* series.

The *Daily Planet* crew was at UA in November to film the UA car and to talk with the students who are preparing to race the car across parts of the United States and Canada next July.

A low-resolution copy of the *Daily Planet* segment can be seen on the web at <http://www.exn.ca/dailyplanet/view.asp?date=11/22/2004>. (You may need to wait a couple of minutes before the video begins.)

The solar car team linked up with Australian Shaun Murphy in June in Aguila, Ariz., which is about 20 miles west of Wickenburg. *Eco Trekker* is a TV series in which Murphy is spending eight months on the road, traveling 16,000 miles through 30 states



Eco Trekker photo

Eco Trekker Shaun Murphy drives UA's solar racecar, *Turbulence*.

without using a drop of gasoline.

Murphy traded off driving the UA solar car, *Turbulence*, and his electric motorcycle between Aguila and Prescott, Ariz. *Turbulence* ran on electricity generated by its solar array, which produces 1,300 watts of power. This is approximately the amount

consumed by a hair drier.

For more on the next American Solar Challenge Race between Austin, Texas and Calgary, Alberta, see <http://www.americansolarchallenge.org/event/asc2005/>

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More info: Trekker



Ed Stiles

Engineering students, who have received Thomas R. Brown scholarships, met with members of the Thomas R. Brown Family Foundation during an October luncheon. The scholarships are awarded to engineering and business students. The students in this photo are all from UA Engineering. The recipients, foundation members, and guests included (from left, back row) Ryan Hatch, Kvar Black, Bryan Davidson, Hayley Brown, Kara Monsen, Mark Lauer, David Smallhouse, Brianna Muhlenkamp, Tom Peterson, Matthew Behrens, and Clay Condon. (From left, front row) Robin Yoshimura, Michael Hard, Sarah Smallhouse, John Carter, Gerry Swanson, and Mary Brown.

Brown Foundation scholarships celebrated

Recipients of the Thomas R. Brown scholarships met with members of the Thomas R. Brown Family Foundation during a luncheon in October at the Arizona Inn.

The foundation is contributing nearly \$1 million over a period of three years to UA's engineering and business colleges. Each college receives \$100,000 per year to assist in

recruiting two world-class scholars. The colleges also are receiving \$50,000 annually for scholarships.

The gift is intended to foster collaboration between the engineering and business colleges and honors Tom Brown, co-founder of Burr-Brown, Corp., who died in 2002.

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More info: Recruiting

Fulbright takes Rozenblit to Poland

Jerzy Rozenblit, department head in Electrical and Computer Engineering (ECE), spent three weeks at Poland's Cracow University of Technology this summer under a Fulbright Senior Specialists grant.



Jerzy Rozenblit

UA ECE Photo

Rozenblit helped faculty at Cracow University to develop:

1. A multi-media, real-time laboratory that will be used for research.

2. A computer-engineering curriculum that will be partially supported by that laboratory.

3. A plan for future research projects to be jointly undertaken by Cracow University of Technology and UA ECE.

Another outgrowth of his Fulbright work may be future faculty and student exchanges between UA and Cracow University.

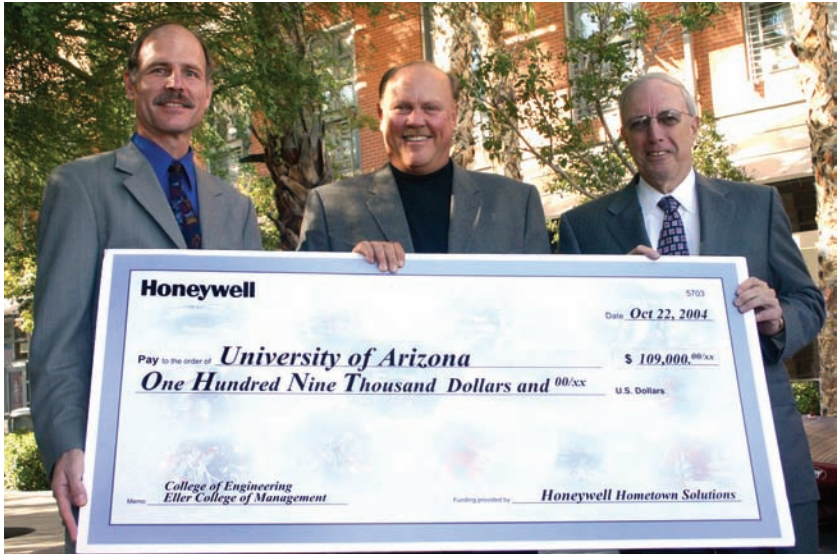
Honeywell supports engineering, business

Robert D. Johnson, president and CEO of Honeywell Aerospace, visited UA in October to present a check for \$109,000 to UA's engineering and business schools as part of the company's ongoing support.

Johnson also spoke at an honors convocation in the Eller School of Management.

In the Engineering College, Johnson got a first-hand look at UA's solar race car and talked with students who are building a new car for this summer's American Solar Challenge Race, which will run from Austin, Texas to Calgary, Alberta.

Johnson also visited with students from UA's Micro Air Vehicle (MAV) Club, who demonstrated a radio-controlled ornithopter and an MAV that



Robert Johnson (center), president and CEO of Honeywell Aerospace, presented a check to the UA engineering and business colleges in October. Accepting the check are Tom Peterson (left), dean of the College of Engineering, and Ken Smith, interim dean of the Eller College of Management.

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has a variable-camber wing.

Engineering will use its share of the Honeywell gift to fund undergraduate

scholarships, the solar car team, the Engineering Ambassadors program, and other programs and projects.



Tom Peterson

Engineering alums from Colorado met in November for a tour of the Lockheed Martin Space Systems Co. and to hear the latest news from UA Engineering. This photo was taken in the lobby of the Engineering Building at Lockheed Martin.

Engineering alums tour Lockheed Martin

Engineering alumni from the Denver, Colo. area met for a UA College of Engineering Alumni Reception and Tour in November. It was held at the Lockheed Martin Space Systems Co. facilities in Littleton, Colo.

Hosts for the event were G. Thomas Marsh, executive vice president of Lockheed Martin Space Systems Co., and Tom Peterson, dean of the UA College of Engineering.

Marsh started the tour with a short talk that put rocket building at Lockheed Martin into a historical perspective. Following his talk,

the group toured the Final Assembly Building. This is where the Atlas and Titan launch vehicles are prepared for shipping to a launch site.

The alumni also toured the 100,000 Class clean room, where the Atlas and Titan Centaurs are finalized for launching.

The event also featured a short talk about the UA College of Engineering by Peterson and a reception that included cocktails and hors d'oeuvres.

Alumni from as far away as Colorado Springs and Loveland attended the event.

Salpointe High honors Bahill

Terry Bahill, professor of Systems and Industrial Engineering, was inducted into Tucson's Salpointe Catholic High School (SCHS) Distinguished Alumni Hall of Fame in April.



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Bahill has published more than 200 papers and authored or co-authored seven books. His latest book, *Keep Your Eye on the Ball: Curve Balls, Knuckleballs, and Fallacies of Baseball* (ISBN: 0716737175), was co-authored with Tulane University Mechanical Engineering Professor Robert G. Watts. It uses physics, mathematics and physiology to explore longtime myths and mysteries of hitting.

The induction ceremony and banquet were held on the Salpointe campus, and about 85 guests attended.

More info: Salpointe

E-Breakfast packs 'em in

A record crowd of nearly 600 alumni, students, faculty, staff and friends of UA Engineering attended the 41st Annual Engineers' Breakfast during Homecoming weekend in October. This easily surpassed last year's big crowd of 450.

Professor Emeritus David Hall was among those given special recognition during the breakfast. He was honored for his role in founding the annual event in 1964.

Chris Lewicki (MS AE '00) was the featured speaker. Lewicki, flight director for NASA's Mars Exploration Rovers Mission, talked about his work at NASA before and during the mission.

Competition was fierce this year between IBM, Honeywell, Raytheon and Texas Instruments for bragging rights that come with bringing



Ed Slites

Paul Prazak (fourth from left) was instrumental in bringing out 81 people from Texas Instruments to the annual Engineers' Breakfast. The alums and friends of the college at this TI table included (from left) UA Physics Professor **Ke Chiang Hsieh**; **Joel Halbert**, TI development engineering manager, High-Speed Signal Processing Products; **Bob White**, TI senior design engineer; **Paul Prazak** (MS EE '73), director, High-Speed Products; **Linda Prazak**, Paul's wife; **Karen Ford** (EE '96), TI strategic marketing engineer, ADC Products; **Mike Koen**, TI development manager, VCA Products; and **Michael Steffes**, TI strategic marketing manager, HSSP Products.

the most employees to the luncheon. Texas Instruments snagged the "prestigious award" — UA, glow-in-the-

dark license plate holder for bringing 81 employees to the event. IBM had 60, Raytheon 52, and Honeywell 22.



MGE Photo

Hank Grundstedt, MinE '51, (left) and Assistant Professor **Hugh Miller**, of UA Mining and Geological Engineering, hold the plaque that dedicates UA's San Xavier Underground Mining Laboratory in Grundstedt's honor. The photo was taken last spring during the dedication ceremony.

Mine lab named for Grundstedt

An underground mine south of Tucson, where Hank Grundstedt shoveled ore as a UA undergrad in the 1950s, has been named in his honor.

The mine, which now serves as a lab for UA's Mining and Geological Engineering Department, was named for Grundstedt in recognition of his ongoing support for the UA College of Engineering.

A 1951 graduate in mining engineering and the recipient of an honorary doctorate in 1970, Grundstedt has established an endowment that will help the college on a number of fronts.

In 2001, Grundstedt also received the Engineering College Alumnus of the Year Award.

UA ChE undergrad tops in nation

Stephanie Freeman, a senior in chemical engineering, has won the top student award given by the American Institute of Chemical Engineers (AIChE).

"Since there is only one award given each year, this gives her at least a virtual claim to being the top chemical engineering junior in the nation," said Jost Wendt, department head in UA's Chemical and Environmental Engineering (ChEE) department.

(Although Freeman is now a senior, she was a junior when nominated for the award.)

The \$5,000 McKetta Undergraduate Scholarship is awarded to chemical engineering students who have at least a 3.0 GPA and are leaders in their local AIChE Chapters.

In addition, applicants write an essay detailing their involvement with industries that manufacture and distribute equipment that is used to control chemical processes.

Freeman spent last semester in the Netherlands conducting research in the microbiology department at Wageningen University. She works on similar research at UA with Professor James Field and Associate Professor Reyes Sierra. Both are in UA's ChEE department.

Freeman, who graduates this year, plans to attend graduate school in chemical or environmental engineering.



Stephanie Freeman

Ed Slites

Technology & Management Executive of the Year



Ed Stiles

TMAL Facts

The annual Technology and Management Awards Luncheon (TMAL) honors five individuals who have made significant contributions to the economic development of Arizona and the nation.

TMAL also highlights the partnership between business and engineering at the University of Arizona. Close collaboration between the two disciplines is important at both the university and corporate levels for the United States to remain competitive in today's global marketplace.

Sponsors

TMAL sponsors include:

- Salter Labs
- Arizona Public Service
- Diversified Human Resources, Inc.
- Fluor Corp.
- Lockheed Martin Corp.
- Mattel, Inc.
- Raytheon

Vance D. Coffman

Vance D. Coffman received the 2004 Technology & Management Executive of the Year Award at the annual Technology & Management Awards Luncheon (TMAL) on Dec. 9.

The award is given by The University of Arizona's College of Engineering and Eller College of Management and celebrates the contributions of high-tech enterprises and entrepreneurial ventures to the economic development of Arizona and the nation.

Coffman was CEO of Lockheed Martin Corp. until his retirement in August 2004 and continued as chairman of the board until April.

The luncheon was held at The Arizona Biltmore Resort and Spa in Phoenix, Ariz.

Coffman earned his bachelor's degree at Iowa State University and master's and Ph.D. at Stanford.

He was selected to receive the Technology & Management Executive of the Year Award because of his leadership role in the aerospace industry, particularly as it relates to space systems.

UA's engineering and business colleges also honored four other executives at TMAL. All are UA alumni.

• **George Sarlo, Lifetime Achievement Award, College of Engineering** — Since 1974, George Sarlo has played a key role in building the Walden Group, a worldwide venture-capital organization.

In addition to his current duties as a director of several public and private corporations, he also contributes extensive financial and technical knowledge to Walden VC's investment portfolio.

Sarlo also is chairman of Ashfield & Co., Inc., an investment management company in San Francisco that has approximately \$2 billion under



Lockheed Martin

Vance D. Coffman

management.

Sarlo is a director of Interplast, The International Rescue Committee, and the Joint Distribution Committee.

Sarlo earned a bachelor's degree from UA in electrical engineering in 1960. He also has an MBA degree from Harvard Business School.

• **Peter W. Salter, Lifetime Achievement Award, Eller College**

— Peter W. Salter is chairman of the board, president, and CEO of Salter Labs in Arvin, Calif. He founded Slater Labs in 1975. Since that time, the company has introduced more than 150 medical-care products and expanded operations from California to Georgia, New Hampshire, Texas, Wisconsin, and Juarez, Mexico.

Under Salter's leadership, Salter Labs has risen to become a leader in several medical product categories, including respiratory care, anesthesia, and oral drug delivery. The company's products are used daily in acute care, extended care, rehabilitation, and home care worldwide.



Ed Stiles

Award winners and UA dignitaries gathered at the Arizona Biltmore for the annual Technology & Management Awards Luncheon. They are (from left) Brian D. Lesk, Diversified Human Resources, Inc.; Ken Smith, interim dean of the UA Eller College of Management; Peter W. Salter, Satler Labs; Vance D. Coffman, Lockheed Martin; UA President Peter Likins; John J. Marietti, Cleaves-Bessmer-Marietti, Inc.; Tom Peterson, dean of UA Engineering; and George Sarlo, the Walden Group.

Salter graduated from UA in 1964 with a degree in history.

• **John J. Marietti, Distinguished Service Award, College of Engineering** — Since 1993, John J. Marietti has served as chairman of the board of Cleaves-Bessmer-Marietti, Inc., an electrical manufacturer's representative based in Kansas City, Mo.

From 1983 to 2001, he also was the company's CEO.

Marietti has served as president of the Electric League of Kansas and Missouri and as president of the Electrical Equipment Representatives Assoc.

In 1997, he received the GEM Award from *Electrical Wholesale* magazine as the person contributing the most to the leadership, integrity, character and development of the electrical industry in the United States.

Marietti graduated from UA in 1961 with a bachelor's degree in electrical engineering.

• **Brian D. Lesk, Distinguished Service Award, Eller College** — In 1996, Brian D. Lesk founded Diversified Human Resource, Inc. (DHR), which is based in Phoenix, Ariz.

DHR is a professional outsource

provider to small- and medium-sized businesses and handles much of the administrative paperwork associated with employees. This includes things such as payroll, payroll taxes, workers' compensation and employee benefit packages. The company also assists clients with risk management and human resource administration.

Prior to founding DHR, Lesk succeeded in several entrepreneurial ventures.

As an active supporter of philanthropic causes, Lesk was recognized in 1999 as "One of Arizona's Finest" by the Cystic Fibrosis Foundation.

Lesk graduated from UA in 1980 with a bachelor's degree in business administration.

TMAL emphasizes the competitive advantage that results from close ties between engineering and business.

The event also highlights the collaborative courses and other endeavors being pursued by the engineering and business colleges at UA.

These efforts address the need to rapidly move knowledge and ideas from universities to corporations.

TMAL History

Past winners of the Technology & Management Executive of the Year Award include:

- 1999
Craig Barrett
President & CEO
Intel Corp.
- 2000
Michael R. Bonsignore
Chairman & CEO
Honeywell International
- 2001
Tom Brown
Founder &
Chairman Emeritus
Burr-Brown Corp.
- 2002
Louise Francesconi
President
Raytheon Missile Systems
Vice President
Raytheon Co.
- 2003
Nicholas M. Donofrio
Senior Vice President
Technology & Manufacturing
IBM Corp.

Philanthropy

The next few pages contain a list of those companies, organizations and individuals who have contributed to the College of Engineering during Fiscal year 2003-2004.

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 2003-2004 and are not on this list, please let us know, and we will list your name in the next issue of *Arizona Engineer*.

\$100,000 OR MORE

Arizona Public Service Foundation
Mildred Bly & The Bly Family Trust
Roger & Evelyn Gallagher
Anastasia Glendenning
Honeywell International
Intel Corp.
Intel Foundation
Leonis Family Foundation
Delbert Lewis



About 90 people attended the fourth annual Scholarship Donor Appreciation Reception in March 2004 to honor individuals and companies who contribute scholarships to engineering students at UA. The reception also gives donors a chance to meet the students who are benefitting from their support. Among the donors who attended were (from left) **Richard Guthrie**, Richard G. Guthrie Scholarship; **Gary Harper**, Salt River Project Hydrology Scholarship; **Patricia Dunford**, Richard G. Guthrie Scholarship; **Paul Prazak**, TI/Burr Brown Scholarship; **David Hall**, RA Jimenez Highway Scholarship; **Judy Canter**, National Coal Transportation Assoc.; **Tom Canter**, National Coal Transportation Assoc.; **Dimitri Kececioğlu**, Dimitri Basil Kececioğlu Reliability Engineering Research Fellowships Endowment Fund; **Genevieve Morrill**, Elbridge and Genevieve Morrill Scholarship; **Merv Kleine**, Lockheed Martin; **Richard Johnson**, ARCS Foundation, Inc.; **Robert Suarez**, ACEC of Arizona Scholarship; **Agnes Johnson**, ARCS Foundation, Inc.; **James Hess**, James G. & Maria C. Hess Scholarship; **Maria Hess**, James G. & Maria C. Hess Scholarship; **Marla Peterson**, Honeywell Scholarship; and **Helmut Hof**, Helmut & Ellen Hof Scholarship.

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Raymond & Jean Oglethorpe
Raytheon Co.
Sol & Elaine Resnick
TechniComp
Texas Instruments, Inc.
Thomas R. Brown Family
Foundation

\$50,000 TO \$100,000

International Foundation
for Telemetering
George & Ruth Sorkin

\$40,000 TO \$50,000

Information Storage
Random Network

\$20,000 TO \$40,000

Analog Devices, Inc.
Arizona Power Authority
Alan Boeckmann
Heraeus, Inc.
Lockheed Martin Corp.
Nokia
Physics, Materials, & Applied
Mathematics
Salt River Project
Salter Labs
Sienna Technologies, Inc.

\$10,000 TO \$20,000

3M General Offices
Therese Berg
Exxon Mobil Corp.
Estate of Ruth Drane Fleming
Joseph Gervasio &
Gervasio & Assoc.
Gilbert & Patricia Gonzales
David Hall
Shao-Chi Lin
The Magheramorner
Foundation
Ernest & Sally Micek
Microchip Technology
Microsoft Corp.
Northrop Grumman
Space Technology
Small Mine Development
Tri-Tronics
United Way of Tucson &
Southern Arizona
Burgess & Patricia Winter

\$5,000 TO \$10,000

AIAA Foundation, Inc.
American Commercial, Inc.
BAE Systems
The Copper Club
Gary & Barbara Cropper

Dial Corp.
Electronic Cooling Solutions
Fluor Enterprises, Inc.
General Electric Co.
Leston & Thelma Goodding
Marguerite Hesketh
Hom Brothers
IBM Corp.
MMLA, Inc.
Genevieve Morrill
Pediamed Pharmaceuticals, Inc.
Phelps Dodge Foundation
Allen & Betty Rosenstein
V. S. Rukkila
Brice W. Schuller
David & Linda Turner

\$1,000 TO \$5,000

Advanced Ceramics Research
AeroVironment, Inc.
Jennifer & Enrique Aviles
AycO Charitable Foundation
Baybridge Dental Clinic
John Belt
Kenneth & Victoria Boyd
Cabot Microelectronics
Ruth & Joseph Campbell
Richard Chartoff
CH2M Hill, Inc.

Philanthropy

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 Debra & Thomas Corbett
 Alina Deutsch
 Jake & Beverly Doss
 William Dresher
 Reece Dunaway
 Richard Guthrie & Patricia
 Dunford
 Empire Southwest LLC
 Howard & Laurie Enloe
 Exxon Mobil Foundation
 Granite Construction Co.
 David Greenberg & Maureen
 Buckley
 Thomas & Judith Hall
 Ernst Hofmann
 Hofmann Family Foundation
 Ta-Ming & Shuh-Ming Hsu
 IBM Corp.
 ILOG, Inc.
 Johnson Western Gunitite Co.
 Kluwer Academic Publishers
 Life Ambulance Service, Inc.
 Lovitt & Touche, Inc.
 Mattel Inc.
 Motorola Inc. Foundation
 Theodore Moulin & Cari
 Cunningham
 The New Nose Co.
 Thomas O'Neil
 Brad Paden
 Mark & Gerry Palmer
 John & Lucy Peck
 The Pittsburgh Foundation
 Joan Pracy
 David D. Rabb
 R.E. Darling Co.
 Rodel Corp.
 Rocky Mountain Coal Mining
 Institute
 Scott/Ross Design, Inc.
 Ernest & Joanne Smerdon
 William & Elizabeth Staples
 Structural Engineers Assoc.
 William Toperzer
 Donald Uhlmann
 Eugenie Uhlmann
 Vanguard Charitable
 Endowment
 The Wachovia Foundation
 Western Coal Trans. Assoc.

\$500 TO \$1,000

Andrew Adams
 American Society of Civil Engineers
 Stephen Arndt
 The Boeing Co.
 Ralph & Marilyn Cady



Ed Stiles

Gilbert Jimenez (right), director of the Arizona Department of Commerce, presented a check for \$75,000 to UA's Center for Low Power Electronics (CLPE) last spring. Accepting the check is Electrical and Computer Engineering Professor Sarma Vrudhula, who directs CLPE. The funds are being used primarily to support graduate student research assistants who are working on CLPE projects.

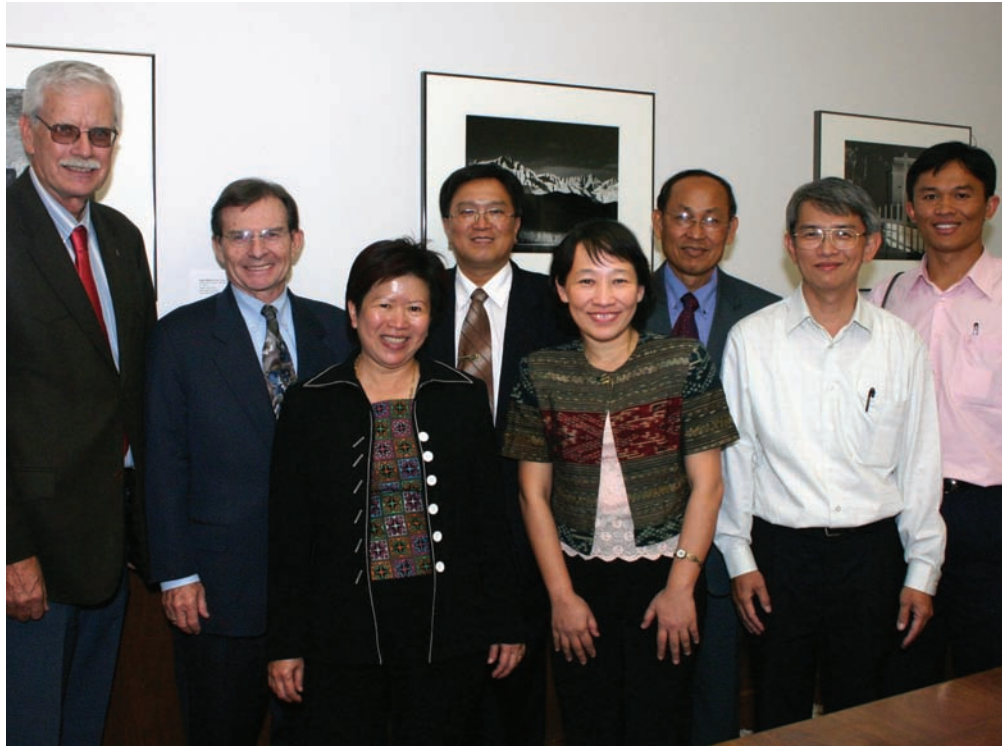
CB Richard Ellis
 Charitable Gift Fund
 Daniel Chen
 Harold & Shirley Cole
 Compass Bank
 Condor Earth Technologies, Inc.
 Bruce Conger
 Bettie & Albert Crawford
 Earl Cumming
 Matthew Diethelm
 Dillard Department Stores, Inc.
 Diversified Human Resources Inc.
 Bette Drummond-Oliver
 Janet Fertig
 Fletcher's Tire & Auto Service
 Walter & Kathie Lee Frost
 Barry & Starr Ganapol
 David Gemelli
 David & Connie Gildersleeve
 Mary Clare & Andrew Gildon
 Grayhawk Venture Partners
 Fred & Jean Hall
 Philip & Anne-Marie Hall
 Richard & Janice Harper
 Harrah's Operating Co., Inc.
 Mark Bruce Hoffman
 Hoffman Family Foundation
 Honeywell Foundation
 Der-E Jan
 Michael & Robin Kaiserman
 Robert Ketterson
 Daniel & Cynthia Klingberg
 Theodore & Gale Landis
 James Madson
 Charles Massieon
 S. Jack McDuff
 Dennis McLaughlin
 Michael Baker Jr. Corp.
 Munger Chadwick
 Nordson Corp.
 Raymond Oliver
 Randall Omel
 Charles Preble
 Pro Clean, Inc.
 Susan & Charles Ramsey
 James Randolph
 Raytheon Asian Pacific Assoc.
 Dallas & Cathy Reigle
 Sarianne Rittenhouse
 Lionel Rombach
 Russ Lyon Realty Co.
 Emilie & Thomas Sandin
 Michael & Mona Smith

Southern Arizona Architects/Engineers
 Marketing Assoc.
 Christopher Toal
 Mary & Ray Turner
 Ventana Medical Systems, Inc.
 Ventana Mercantile LLC
 Shohei Yoneda
 Ziva Partners LP

UP TO \$500

Gabriel M. Abraham
 Robert Acosta
 Gregory & Kathleen Adams
 Jack Adams
 Timothy & Barbara Aden
 Manuchehr Afari
 Agilent Technologies
 Bajarang & Sumitra Agrawal
 Winifred & Edwin Aguanno
 Bushra Ahmad & Arthur Post
 Iftekhar Ahmed
 Kurt Alcumbrac
 Carol Alderman & Richard Kurtz
 Peter Alexander
 John Alexander
 Alliant Techsystems Inc.
 Thomas Allred
 Mohammad Almasri
 Charles Almestad
 Randy & Barbara Alstadt
 Larry Altuna
 American Electric Power Service
 James & Kathryn Ammon
 Anton Anderson
 Carl Anderson
 Darcy Anderson
 Michael Anderson
 Susan Anderson
 Steven Anderson
 Howard & Sally Angell
 Dennis Angelo
 Chris Angleman
 Mony Antoun
 Andrew & Judith Apostolik
 Jimmy Archer
 Felix Armendariz
 Brian Arnold
 Lawrence Aron
 David Aros
 Adrian Arozqueta
 Samuel & Diana Ash
 John & Sherrie Ashcraft
 Darin Ashley

Ronald & Jacalyn Askin
 Micheal Attaway
 Brian Aviles
 Shayne Aytes
 Paul & Katherine Babonis
 Charles & Judith Backus
 Kwang Baik
 Bill & Diane Bain
 Frederick Bakarich
 John & Carol Baker
 Jonathan & Mary Baker
 John J. Baker
 Victor Baker
 Fred Bakun
 Craig & Janet Baldon
 Ball Corp.
 Ray Ballmer
 Cedric Balozian
 James & Linda Barber
 Kim & Carolyn Bargeron
 Darlene Barlow
 Richard & Georgia Bartholomew
 Michael Barton
 Sukhendu & Susmita Barua
 Eugenia Bas-Isaac
 Elizabeth Bauer & Peter Brown
 Suzan & Edward Bawolek
 Michael Bayley
 Kirk Beatty
 Hugh Beauregard
 Bechtel Group, Inc.
 Ellen & Edmond Beck
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 James & Trudy Beddessem
 William Beecroft
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 John & Judith Bellamy
 Lloyd & Marjorie Benes
 Steven Bengis
 Michael & Linda Benhase
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A delegation from Khon Kaen University (KKU) in Thailand visited UA in October to sign a Memorandum of Agreement (MOA) between their university and UA. The MOA has an emphasis on nanotechnology research, which the Thai government is supporting with significant research funding. Those attending the signing were (from left) **Don Slack**, department head in UA Agricultural and Biosystems Engineering; UA President **Peter Likins**; **Wanpen Wirojeanagud**, KKU environmental engineering; **Sumon Sakolchai**, KKU president; **Aroonsri Priprem**, KKU pharmacy; **Pisan Sirithon**, KKU VP for research; **Vittaya Amornkitbamrung**, KKU physics; and **Santi Maensiri**, KKU physics. Original contacts with KKU that resulted in the MOA were made by UA Materials Science and Engineering Professor Supapan Seraphin. Slack acted as liaison with the KKU group at UA because he taught at KKU more than 30 years ago and speaks Thai.

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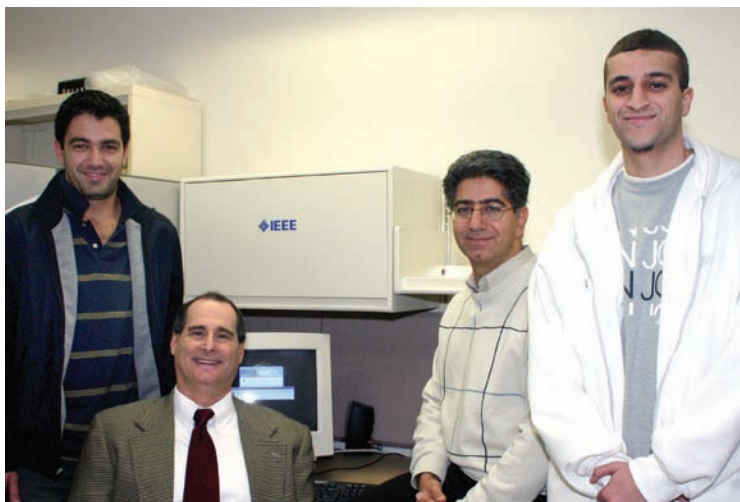
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Raytheon Fellow Philip Rosengard (second from left) is collaborating with Professor Marwan Krunz (second from right) on research relating to improving database response time. Rosengard was visiting Krunz's lab in UA's Center for Low Power Electronics when this photo was taken. He and Krunz are with two of the graduate students who are working on the project, Alaa Muqattash (left) and Osama Solieman.

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Philanthropy



Ed Stiles

The Association of Facilities Engineers (AFE), Tucson chapter, sponsors a golf tournament each year to raise funds for a number of charitable causes. Among them is the Walt Willis Memorial Scholarship, named for an electrical engineer who was a founding member of the Tucson AFE. Willis worked with UA Facilities Management and died of cancer at age 38 in the late 1980s. The scholarship is awarded annually to a student in electrical or mechanical engineering. In addition to the annual Willis Scholarship, AFE's Goodwill Golf Tournament has raised \$10,000 for cancer research at UA and \$11,000 for Tucson's Pio Decimo Center, a multipurpose neighborhood center. This year's Goodwill Golf Tournament is on June 17. Those interested in participating and companies that would like to sponsor a hole on the course should contact Chris Kopach, associate director of UA Facilities Management, at 520-626-4919, kopachc@fm.arizona.edu. J. Brent Hiskey (left), associate dean for research and administration, accepted the Willis Scholarship check for UA Engineering in January. Presenting the check were Kopach (right) and Al Tarcola, director of UA Facilities Management.

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Kathleen Scruggs			Warren White	
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			Robert Wickliffe	

Robotic Vision

Continued from Page 1

on the faculty in the Arizona Research Laboratory's Division of Neurobiology, which is recognized as one of the world's leaders in studying insect vision. He conducts research in the neuroscience labs to find out how insect vision works and then transfers those results to the ECE lab, where he

creates electronic-vision circuits based on the insect model.

These circuits don't use standard microprocessors. Instead, they're based on what's called "parallel processing" — a bunch of slower, simpler analog processors working simultaneously on a problem. In traditional digital computers, problems are solved in serial fashion, where a single fast digital processor flashes through

a series of steps to solve the problem sequentially.

"I'm not talking about a vision system that will do everything our vision system will do, or even everything an insect's visual system will do," he said. "I'm looking at a lot less — a very specific vision subsystem that accomplishes a specific task."

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More info: Higgins



Hot rods have led many students to mechanical engineering careers and these days a high-tech hot rod — UA's screamin' formula car — is keeping some students in school.

"I would not be an engineer and I would not be in school right now if it weren't for this (SAE formula car) club," said Dustin Wright, the team's director of manufacturing. "When I ran into this club, I was so frustrated with engineering and college in general that I was ready to quit."

"These student projects (formula car, mini-baja vehicle, solar car, etc.) keep people in school," Wright added. "They keep students motivated, and they give them an outside interest that they learn from."

The Ultimate Lab Class

In fact, the UA formula car just may be the ultimate lab class.

Freshmen and sophomores learn complex computer analysis and other sophisticated skills from the club's upper classmen. When they later meet these concepts in class, the classroom work is more like a review than a new learning experience.

The club also extends its teaching to Tucson's grade schools and middle schools, where team members explain and demonstrate the car.

Educating Younger Students

"One of our biggest goals is to educate younger students, as well as the community, about what we do and how they can get involved in higher education and engineering," said formula car Team Captain Ryan Kanto. "We also talk about alternative fuels because our car runs on ethanol,

'I would not be an engineer and I would not be in school right now if it weren't for this (SAE formula car) club.'

— Dustin Wright

which is made from corn."

Students also learn a lot as the 140 or so formula car teams that participate in the annual SAE formula car competition share test data, tools and other information.

"All of the teams realize that this isn't a competition with other teams," said Ryan Kemmet, marketing director for UA's formula team. "Maybe the top ten teams are going to keep some of their information proprietary and aren't going to share it, but most teams will gladly share information because building a formula car is a learning experience."

No More Mistakes

"Our primary goal at the end of last year was to say, 'Look, we don't want to make any more mistakes,'" Kanto said. "Mistakes are great and we learn from them, but if we're going to build a car, let's try to build it right the first time so that we don't have to waste our time with rebuilds.' So everything now is run through the computer. The parts are tested and weighed. We do finite element analysis on everything so we know the parts are not going to break before we build them."

The team also has used the engineering college rapid prototyping equipment to quickly build mock-ups to be sure that parts will fit before



Jon Schwab (left), the formula car team's director for electronics, talks with team member **Chris Bunch** during a driver practice session.

they're machined. In other cases, the rapid-prototype parts have served as male molds on which carbon-fiber parts are built.

Once the part is completed, the mold is dissolved out leaving the carbon-fiber shell. The team used this method to build the formula car's intake manifold.

All of which has been a great learning experience.

"All I can say is that building this formula car has been the most fun I've ever had in school," Wright said. "I've learned almost more from working on the car than I have from my engineering classes."

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More info: Formula Car

Students build rover to explore old mines

Two Aerospace Engineering seniors have built an 18-inch-long, radio-controlled rover to explore an old mine near Congress, Ariz.

Old mines can be dangerous places, and the rover will take all the risks associated with crumbling walls; vertical shafts; poison gas; wildlife and other dangers.

The rover is equipped with a powerful searchlight to explore the mine's dark recesses and a pan-and-tilt video camera to send images back outside to a laptop computer.

"Jessica Dooley and I made the ground rover to tour a mine on her grandmother's property," said Keith Brock. "The mine shaft is too small and too dangerous for us to explore ourselves, so we thought we could make a rover to do it for us. We want to see if there is anything cool inside."

Dooley and Brock are veterans of UA's Aerial Robotics Club, which builds robotic airplanes that fly themselves and send back video images of remote targets. With that kind of background, designing and building a ground rover didn't take long — about three weeks, including the time needed to write the software in Visual Basic.



Keith Brock (left) and Jessica Dooley with their mine rover and associated hardware.

The rover is about 1.5 square feet in area and seven inches tall. It can be controlled with a joystick, computer mouse or cursor tracking. The cursor tracking or "mouse tracking" is linked to the rover's video camera. Move the cursor to a point on the image sent back from the video camera, and the camera will center over that part of the image where the cursor lies. "If you have a moving object, you can follow it with the mouse and the camera will automatically stay centered on it," Brock said.

The rover is built entirely from off-

the-shelf components. But a considerable amount of expertise in robotics was needed to assemble them into a functioning rover.

With a donated radio modem and parts that Brock and Dooley had lying around in their well-stocked junk box, they were able to build the robot for about \$200.

They estimate that building it from scratch with all-new parts would cost about \$1,000.

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More info: Mine Rover

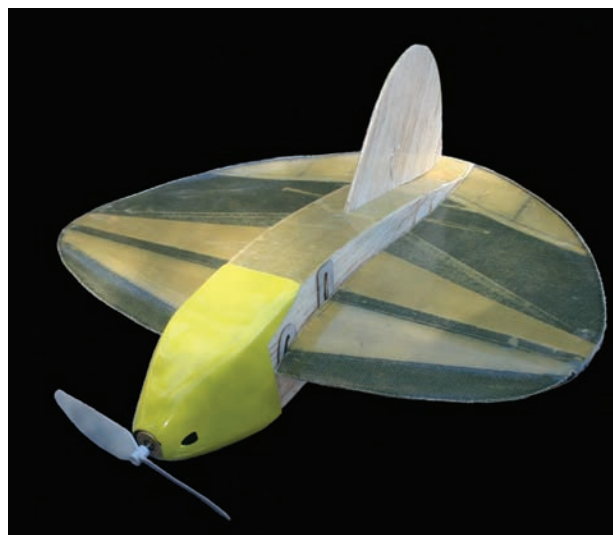
Novel wing changes shape to maximize MAV performance

A variable-camber wing is the latest development in UA's Micro Air Vehicle (MAV) program.

Master's student Motoyuki Aki designed the wing, which changes shape so that it can fly slowly on takeoff and when circling a target, and much faster when it's flying to and from the target.

By changing the camber of its wing and speed of its motor, the radio-controlled plane can vary its airspeed by a factor of three, from about 11 mph to 33 mph.

The wing is the first part of a research program on non-traditional wings, says Aki's faculty advisor, Assistant Professor Sergey Shkarayev. "We also want to study ways to transform wingspan and the whole planform of the wing. This will open the way to aircraft designs that mimic those of birds and insects, but that aren't used by today's aircraft."



This Micro Air Vehicle incorporates a variable-camber wing designed by Aerospace Engineering graduate student Motoyuki Aki. The wing is made from a thin sheet of Styrofoam sandwiched between two layers of Kevlar. The yellow part in the middle of the wing is a Kevlar hinge. The black areas are reinforcement strips made from carbon tissue.

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More info: Variable Camber

For Mark Neifeld, image is everything

Imagine a thin camera that can conform to surfaces such as an airplane wing or a medical probe.

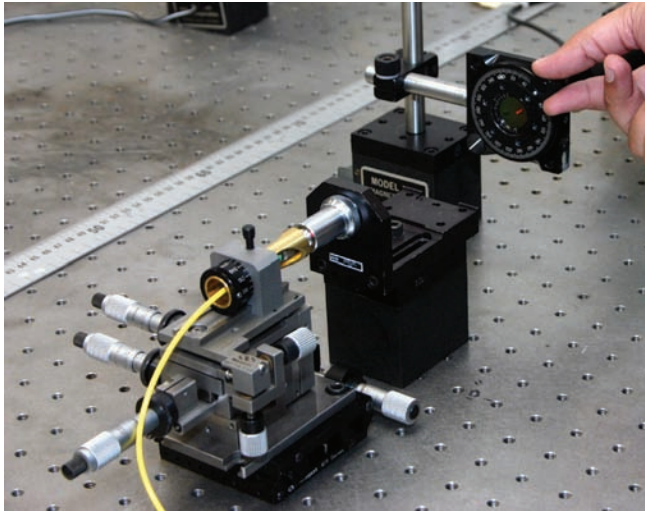
Now imagine that it's tiny and lightweight, but still produces images that rival those from today's most sophisticated professional cameras.

Although many of today's cell phone cameras have tiny lenses, they produce only low-quality images.

"We're trying to produce thin lenses that retain the aperture, collect the same amount of light, and retain the high resolution and large fields of view that you'd find in professional-quality camera lenses," said Mark Neifeld, professor of Electrical and Computer Engineering (ECE).

Neifeld, who also holds an appointment in UA's Optical Sciences Department, is leading a group that has won a \$5.5 million DARPA (Defense Advanced Research Projects Agency) grant to produce a new kind of lens.

UA ECE is leading the team, which includes researchers from MIT, UC San Diego, Distant Focus Corp. of Urbana-Champaign, Ill., and CDM Optics of Boulder, Colo.



Ph.D. student Amit Ashok adjusts a variable polarizer, which is a tunable attenuator that controls the strength of laser light. It's part of an experimental setup to test non-traditional methods for creating photographic images.

Eci Stiles

So far, about half the grant has been awarded for Phase I of the project.

"The key to Phase I is to invert the aspect ratio of the optics from what it is in traditional cameras," Neifeld said.

Aspect ratio is the lens thickness (or length) divided by its diameter.

An inverted aspect ratio is important in applications that require minimal size, weight and bulk. An inverted-aspect-ratio lens could be wrapped around curved surfaces and wouldn't create the large torque that results from conventional optics.

Neifeld also is studying ways to

form an image that is not an image in the traditional sense. This is analogous to an MRI, where the image is reconstructed from the raw data.

The research is being conducted under DARPA's Multiple Optical Non-redundant Aperture Generalized Sensors (MONTAGE) Program.

The UA MONTAGE grant is one of two awarded by DARPA. The other MONTAGE grant went to a research team led by Professor David Brady, of the Duke University Electrical and Computer Engineering Department.

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More info: Neifeld

Civil Engineering research aids high school gym

UA civil engineers have devised a structural engineering solution that allowed the Coolidge School District to add elevated bleacher seating to its Roundhouse Gym. This was done at minimal cost and disruption to school activities.

Ceiling beams located under the second-floor bleachers were strengthened with Fiber Reinforced Polymers (FRPs) similar to fiberglass and Kevlar.

QuakeWarp, Inc., a company formed by UA Civil Engineering Professor Mohammad Ehsani, has employed FRPs in the past to strengthen concrete beams and col-

umns, reinforce masonry walls, and retrofit large pipes.

In Coolidge, Ariz., the school district wanted to create elevated bleacher seating above the locker rooms that are next to the gym floor. Unfortunately, placing this load on top of the locker rooms wasn't anticipated when the gym was built in the 1960s.

Placing vertical columns under the floor to strengthen it would have severely restricted space in the locker rooms, and additional horizontal beams would have been costly and difficult to install.

So Ehsani tested glue laminated (glulam) wooden beams similar to those used in the gym. He and master's student Nathan Palmer found that a reinforced beam was 67 percent stronger than the unmodified one.

With this data in hand, work began



A retrofitted beam in the Coolidge Roundhouse gym is encased in a carbon-fiber covering.

Mohammad Ehsani

on the Roundhouse gym.

The beams were retrofitted in less than two weeks — while the locker rooms remained in use — at a cost of \$8.50 per square foot.

"This was a very inexpensive solution," Ehsani said. "Sometimes floor tiles used as floor covering can be more expensive."

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More info: Ehsani

New giving society engages patrons in discovery process

UA's College of Engineering has formed a new giving society named for Leonardo da Vinci. It will benefit faculty and students while directly engaging patrons in the discovery process.

Da Vinci Circle members either contribute to the Dean's Fund or support a favorite department or program within the college.

In return, the college is creating programs and events for da Vinci Circle members that reflect the diversity and richness of da Vinci's broad-ranging intellect.

The program includes a Renaissance-like combination of ongoing seminars, lectures, excursions, tours, events and other activities reserved exclusively for members of the da Vinci Circle.

The giving society was named for da Vinci because College of Engineering students and faculty share his quest for knowledge and his vision for creating a better future by studying the



This new brochure explains the details of UA Engineering's new giving society. To get a copy and to learn more about the da Vinci Circle, contact Beth Weaver, College of Engineering director of development, at 520-621-8051, mlfritz@email.arizona.edu.

natural world and applying what they learn to solving problems important to humankind.

In fact, Leonardo da Vinci, Renais-

sance painter, sculptor, scientist, and engineer, would feel right at home in one of UA's engineering labs. And he would understand the key role that patrons play in creating new ideas and inventions.

The da Vinci Circle program would not be possible without its dedicated board of advisors. The board includes:

David Areghini, Salt River Project

Mike Arnold (da Vinci Circle Chair) Founder and former CEO of Modular Mining Systems

Ed Biggers, Hughes Missile Systems (retired)

Jim Bly, Arizona Department of Transportation

Cynthia Klingberg, Raytheon Missile Systems

Daniel T. Klingberg, Raytheon Missile Systems

Karl F. Kohlhoff, HDR Engineering, Inc.

Linda Lohse, Foundations

Jack McDuff, S. Jack McDuff & Associates, Inc.

Sarah Smallhouse, Thomas R. Brown Family Foundation

Dave Turner, Retired

Web pages chronicle history of engineering at UA

The UA Engineering web site, <http://www.engr.arizona.edu>, has a new section devoted to the history of the college.

The College of Engineering began when UA opened its doors in 1885 and UA Engineering has a long and rich history — from the end of Frontier days and the Apache Wars to today's Information Society.

Mining was the bedrock of Arizona's economy when the college was formed, and educating mining engineers was a top priority. As the state's economy grew and diversified, the College helped provide the research and engineering expertise necessary to that growth.

Through the years, the college has educated thousands of engineering leaders and enriched the economies of Arizona and the nation, while equally enriching the fund of scientific knowl-

edge on which modern society is built.

This web site follows the growth of engineering at UA from its start in a few rooms in Old Main to its current form, which spans many disciplines and several buildings on campus.

In today's high-tech era, graduates of the college continue to develop technologies and start companies that are creating jobs and improving our quality of life.

The history web pages are an ongoing project. The college encourages alumni, current students, faculty and staff members to get involved by sharing their memories of UA Engineering and by sharing photos to add to the online collection of historical photographs. For more information on how you can get involved, visit the "Share Your History" page at: <http://www.engr.arizona.edu/history/share.htm>.



Join the celebration as Civil Engineering turns 100

If you're a civil engineering alum, you'll want to be on campus for Homecoming 2005 or at one of the CE Centennial events scheduled for several Western cities.

During Homecoming Weekend, Nov. 4-6, events will include tours of the department, a golf tournament, awards banquet, induction of the first alums into the Hall of Distinguished Alumni, grand opening of the Civil Engineering History and Heritage Exhibit, and the



Jane Rider, CE '11, was the first woman to graduate from UA with a civil engineering degree.

Homecoming football game.

Activities also are being

planned in Las Vegas, Los Angeles, San Francisco, Phoenix, and San Diego.

The CE History and Heritage Committee is asking alumni to share old photographs, newsletters, amusing stories and good memories from their years at UA.

To find out how to contribute to the History and Heritage project and for more on the CE Centennial celebrations in Tucson and elsewhere, see the department web page at <http://civil.web.arizona.edu/>

Alumni Echoes



Tom Buick, P.E., CE '65, has joined Morrison-Maierle Arizona, Inc.

'60s

H. Charles Romesburg, MS NE '62, is a professor in the College of Natural Resources at Utah State University. For the past 20 years, he has been reading the diaries and journals of creative people to understand how creative lives work. He has synthesized and compared important creative aspects of the lives of engineers, scientists, entrepreneurs, artists, rock climbers, and others.

The results of this work have recently been published in his book, *The Life of the Creative Spirit* (ISBN 1-4010-0258-7).

Thomas R. Buick, P.E. CE '65, former Maricopa County director of transportation and county engineer, has joined Morrison-Maierle Arizona, Inc. to head its southwest regional transportation group.

As principal engineer for the firm, Buick will work on a broad range of public works projects including water, wastewater and drainage systems, in addition to his emphasis on transportation systems.

Before working for Maricopa County, Buick served as director of public works for the City of Chandler and as director of Pima Association of Govern-

ments' Transportation Planning Division in Tucson.

In addition to his public works accomplishments, which earned him the national APWA "Top 10 Leader" honor, Buick is noted for his work as co-chair of Arizona's AZTech™ Intelligent Transportation Systems (ITS) Model Deployment initiative in the Phoenix area.

Buick's wife, Gail A. Buick, also earned a degree from UA in 1965. They have five daughters, two of whom are UA grads.

'70s

William D. Mensch, Jr., EE '71, was elected to the Computer Museum of America Hall of Fame (<http://www.computer-museum.org>) last year. He now has been selected as one of 250 people to be included in *Leaders of the Information Age*, a book edited by David Weil, curator and executive director of the Computer Museum of America. To read more about the book, see http://www.hwwilson.com/print/leaders_info.cfm.

Mensch is the founder, chairman and CEO of The Western Design Center, Inc. (WDC) in



In Memoriam

William H.J. Cleverly, CE '52, died on June 1, 2004 from cancer. He was 74.

After graduating from UA, he earned a master's from Stanford and a Ph.D. from Oklahoma State. Both were in civil engineering.

Cleverly also was a Lieutenant in the Navy during the 1950s.

He lived in Phoenix and Scottsdale and was in the real estate industry as a developer and homebuilder, including founding Golden Heritage Homes in 1958, which continues today.

Cleverly is survived by his former wife, Patricia June Wenneis; 3 sons, (Robert and William, both UA 1980, and Scott), 9 grandchildren, and 1 sister.

Mesa, Ariz.

He holds 22 patents for microprocessors, microprocessor peripheral devices and microprocessor systems.

'80s

Lisa M. (Schmitt) Morrison, ChE '86, joined PPG Industries, a global manufacturer of coatings, resins, chemicals, and glass in December 2003 as the corporate process safety manager. She is working in Allison Park, Penn. and is responsible for limiting business liability by



Several alumni who graduated before 1950 attended the Engineers' Breakfast during Homecoming. After the breakfast, they talked with Engineering Student Council President Ana Hoffnagle (second from right), a Chemical Engineering senior. The alums are (from left) Robert Ageton, MinE '42, MS MinE '46; Ted Gay, ME '49, MS ME '50; Genevieve Morrill, CE '43; and Frank Culhane, ME '49. For more on the Engineers' Breakfast, see Page 5.

Send us e-mail!

And update your former classmates and friends about where life has taken you since graduation.

Please include the following information:

- 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.



H. Charles Romesburg, MS NE '62

providing strategic direction and leadership in a broad range of loss prevention, process safety, and risk management activities.

Morrison has been involved in chemical process safety management for about 13 years, has written several papers on process safety, and has given presentations in the United States, Canada, and Europe.

This past year her business travels took her on an around-the-world trip (14 flights, 6 currencies, 3 continents). Although it was a very hectic trip, she did find time to tour Hong Kong, visit the Forbidden City, and climb the Great Wall.

Timothy J Burgess, EE '89, married Holly Melzer, Animal Health Science '88, in 1988. They moved to Raleigh, N.C. in 1989, where he worked as a digital circuit designer in the telecom industry. They moved back to Tucson in 1995 and Burgess is working for Raytheon Missile Systems as a digital circuit designer.

They had their first child, Aubry, in March 2004. "It's very exciting to be a dad!" Burgess says.

In his spare time Burgess is involved with his church, Community Church Of The Foothills, and runs his Camaro at the drag, autocross, and road race tracks. He's built many electronic gadgets for the car, the latest being a wide-band oxygen sensor system that he's interfacing to the engine computer for capturing engine-tuning data.

Burgess also participates in competitive cycling and running events. He rides in local bicycle races, such as the El Tour De Tucson and Cochise County Classic. He also competes in local triathlons.

'90s



Tim Burgess, EE '89, and Holly Burgess, Animal Health Science '88.

Gary L. Smith, Ph.D. MSE '93, is a staff scientist and leads the Glass and Materials Science Team at the Department of Energy's Pacific Northwest National Laboratory (PNNL). He was recently elected chair of the ASTM International Committee C26 on Nuclear Fuel Cycle. This committee develops standards important to work done on the nuclear fuel cycle, including spent nuclear fuel, waste materials and repository waste packaging and storage.

Smith also received the Harlan J. Anderson Award, which is presented annually to a member of C26 who has made



Gary L. Smith, Ph.D. MSE '93

Alumni Echoes

outstanding contributions to the committee's success. Smith is a Fellow of ASTM International and of the American Ceramic Society, and is also a member of the Materials Research Society.

ASTM International is one of the world's largest standards development and delivery organizations. Their standards are recognized and used in research and development, product testing, quality systems and commercial transactions.

Christopher Stehno, ChE '95, worked as a chemical engineer for a couple of years after graduating, but then decided to turn his hobby into a career. He's been a computer programmer for the past seven years and says, "I have loved every minute of it."

Stehno specializes in website and enterprise back-end development using primarily Java technologies. "I have relied on my engineering background more often than you would think," he adds.

In January, he became a senior software engineer for FinanCenter (www.finan-center.com), a company that specializes in online financial calculators and consumer lead gathering technologies for clients such as Bank of America



Lisa M. (Schmitt) Morrison, ChE '86, and co-worker, **Loren Anderson**, on the Great Wall of China.

and AOL.

Before that, he worked at Maddenmedia for two years as a senior web application developer.

"I have been married to

my beautiful wife, Ariana, since 2001 and we have two over-pampered cats," Stehno says. "Life in the Information Technology field has its ups and downs, but I get to go to work

every day and do my hobby while getting paid for it — you can't get better than that."

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