

Smart traffic controls tested in Tucson

Dr. Mark Hickman, assistant professor in CEEM, is one of several UA engineers testing an intelligent traffic control system in Tucson that is designed to make traffic move faster.

This system, called RHODES (Real-time Hierarchical Optimized Distributed Effective System), uses traffic signals that are controlled by computers to evaluate the traffic situation. Then it determines how to time the traffic lights to move the greatest number of cars in the least amount of time.

RHODES can sense traffic flows and traffic problems, such as accidents, so that all drivers—especially those in buses and emergency vehicles—can reach their destinations sooner.

Random tests were conducted in early February 2003 along a three-mile



Mark Hickman



Video cameras at signalized intersections are used to collect data on traffic queues and delays. Cameras on the four approaches to Speedway and Cherry are shown in the above photo.

stretch of Speedway Blvd. between Euclid and Alvernon.

RHODES employs video cameras at intersections and loop detectors in the pavement several blocks from the intersections. These devices, which gather data on the volume and speed of traffic, are connected to computers. Since the data is updated every second, the computers are designed to control

traffic lights in “real time” to optimize traffic flow.

“We expect the RHODES system will reduce travel time for everyone,” said Hickman. “We will continue to refine the RHODES system and hope to implement it more widely in Tucson in the near future.”



Alumni Industry Council members elected officers at their 12/13/02 meeting. I to r: Ed Nowatzki (co-chair), Dave Turner (former co-chair), Tom McGovern (vice chair), Kathleen Chavez (secretary/treasurer) and Juan Valdés (co-chair). Story on page 6.

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Highlights from this year

Excelling in difficult times

By Juan B. Valdés, CEEM Head

Amid extensive budget cuts, the faculty, students and staff excelled in numerous activities during the past year. For example, Civil Engineering and Engineering Mechanics (CEEM) ranked first among all civil engineering departments in the country regarding citations per paper for a five-year period from 1997 through 2001.

Since July of 2001, our faculty has written five textbooks, 62 papers in referred journals, three book chapters, 60 proceedings papers, and edited one proceedings volume. In addition, various faculty members have received several national and international awards.

The UA student chapter of the American Society of Civil Engineers competed with 17 other universities in the Pacific Southwest Regional Conference that was held on April 2003 in Tempe, AZ. Our group won third place overall.

In addition to the already-established Alumni Industry Council

(AIC), CEEM organized a smaller ad-hoc group called the Friends of the Department (FOD) in the spring of 2002 to handle urgent short-term assignments. Last summer, they organized and distributed an employer survey to evaluate CEEM graduates in the workforce.

The AIC, formerly co-chaired by David Turner, elected Dr. Edward Nowatzki as co-chair at its December 2002 meeting. The AIC met twice in Tucson this spring to discuss a new internship program and is planning a fall 2003 meeting in Phoenix.

These stories and more are included in this issue of the "Civil View."

In other news, the CEEM Department earned full accreditation by the Accreditation Board for Engineering and Technology (ABET) in 2001.

Many faculty members have exciting new projects. For example, Dr. Muniram Budhu is involved in the Geotechnical, Rock, and Water Resources Library (GROW), which is a cross-campus, cooperative development project created by CEEM, the UA Center for Campus Computing and the UA Library. This project is developing an initial digital library designed to meet the education needs

of students and professionals in three areas of civil engineering: geotechnical, rock and water resources.

CEEM is beginning preliminary preparations for a 2005 celebration to recognize the department's centennial anniversary. More details will appear in our next newsletter.

In February of 2002 and 2003, our CEEM staff won first place in the annual food drive competition between departments in the College of Engineering & Mines to benefit our local community food bank. CEEM collected 2,734 items (canned goods and money) this year by sponsoring numerous raffles and bake sales.

The faculty, staff and students of CEEM wish to thank those alums who have generously contributed financial support via scholarships to deserving civil engineering students. A list of current scholarships and recipients is available on page 5.

We want to express our thanks to the Salt River Project for printing this newsletter and to Davey-Cairo Engineering for covering the mailing expenses.

Pledges: Thank you for contributing to the UA CEEM

Name _____

Address _____

City _____ State _____ Zip _____

Enclosed is my tax-deductible donation. My check, payable to the **U of A Foundation**, is attached with a note indicating that the donation should go into the **Civil Engineering and Engineering Mechanics Fund**.

Significant tax advantages are available by giving to the department through estate planning. Please send me more information on this subject.

I may be interested in endowing a fellowship or project.

My company will match my gift. The official company form is attached.

Please mail this form to:

Business Office
Civil Engineering &
Engineering Mechanics
The University of Arizona
PO Box 210072
Tucson, AZ 85721-0072
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Editor/Writer: Susan Kinsey

Alumni Profile

Joseph Gervasio

Joseph Gervasio, CE '57, received the Arizona Alumni Association's Distinguished Citizen Award at the 34th Annual Homecoming Breakfast on November 8, 2002.

Gervasio is president of Gervasio & Associates, Inc., a Phoenix engineering firm responsible for projects valued at \$150 million annually. He is a member of the American Consulting Engineers Council, American Arbitration Association and Rotary Club of Phoenix.

Gervasio provides invaluable insight from an industry perspective to the UA College of Engineering and Mines as a member of the college's Industry Advisory Council. In addition, he is an active member of CEEM's Alumni Industry Council.

Gervasio also chairs the Maricopa County Engineering Alumni Council and is an AdvCat, the UA's legislative



Joseph A. Gervasio (second from left) with his daughters, Therese Schouten and Mary Beth Gervasio, and his brother, William Gervasio.

advocacy network. He served as a primary sponsor of UA Pride Night in 2002 and 2003.

He served on the board of directors for the Arizona Cactus Pine Girl Scout Council from 1994 to 2000. From 1989 to 1999 he was a member of the City of Phoenix Building & Safety Advisory Board, and served as

its chairman in 1993.

"Joe's pride and enthusiasm for being part of this institution and this college are incomparable," said Engineering Dean Tom Peterson. "The College of Engineering and Mines is fortunate to have such a dedicated and steadfast supporter of its programs and its mission."

Awards

Faculty

- **Achintya Haldar** received an honorable diploma from the Czech Society of Mechanics (CSM) for contributions to Czech education and organizing the Euro-SiBRAM 2002 International Colloquium. The honorable diploma is the highest award that the CSM gives to international scholars.
- **Kevin Lansey** received the Huber Research Prize from the Society of Civil Engineers for research on water distribution systems.
- **Margaret Petersen** received the 2002 Environmental and Water Resources Institute Lifetime Achievement Award (EWRI).

- **Ernest Smerdon** received a lifetime achievement award from EWRI.

Alum

- **Delbert Lewis**, CE '50, received the UA College of Engineering and Mines' Lifetime Achievement Award at the annual Technology & Management Awards Luncheon in December of 2002.

Friends of the Department addresses short-term concerns

In spring of 2003, Dave Turner, Ed Nowatzki and Juan Valdés formed the Friends of the Department (FOD), consisting of 12 local practitioners who handle urgent short-term departmental concerns. This team was developed to aid the Alumni Industry Council (AIC).

The FOD assists the department with various projects, such as the development of a new internship program that will be implemented soon. Last summer, they wrote and distributed employee questionnaires to 91 engineering businesses to learn how recent CEEM graduates are coping in the engineering field.

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Kevin Lansey

CEEM professor studies hormones in water

Dr. Kevin Lansey, a professor in CEEM, is one of several UA engineers working with the City of Tucson, Pima County and the United States Geological Survey (USGS) to measure pharmaceutically active compounds (PhACs) in Santa Cruz River water. These PhACs, including estrogenic chemicals, occur in trace concentrations. Other faculty members involved in this project include Robert Arnold and Wendell Ela from Chemical and Environmental Engineering plus David Quanrud, formerly a research associate in CEEM and now with the Office of Arid Lands.

The team has found biologically significant estrogenic activity in samples of Santa Cruz River water collected between Roger Road in Tucson and Trico Road in Marana—nearly 30 miles downstream. They used “in vitro” (cell free) bioassay techniques

that measure effects caused by estrogenic chemicals, rather than directly measuring the hormones.

The team will conduct additional tests in the near future to validate initial sampling results and further evaluate the fate, transport and persistence of estrogenic chemicals in river water and ground water. “We will continue sampling in the Santa Cruz River and other effluent-dominated streams,” said Lansey.

Humans typically respond to very small concentrations of hormones. Drinking two liters of water per day with the highest concentration of synthetic estrogen measured by the USGS will provide a few percent of the dose found in some birth control pills.

“We do not expect the Central Arizona Project (CAP) water to have measurable endocrine activity,” said Lansey. “PhAC are normally

associated with wastewater from urban areas. The Colorado River water is not significantly influenced by wastewater discharges and should not be affected.”

“There is no way the city or county should have had an idea that estrogens and other PhACs are present in reclaimed water,” explained Lansey. “They are not required to test for them, and the technology to measure many of these chemicals at these low levels is very new. By their cooperation on our project, both groups are taking proactive roles in identifying potential future water quality issues.”

Aerial view of Sweetwater Recharge Facility infiltration basins along the Sana Cruz River



Simon Washington

Research incorporates safety into transportation planning

Dr. Simon Washington, an associate professor in CEEM, is spearheading a research project funded by The National Academies-National Cooperative Highway Research Program (NAS-NCHRP). His project, entitled “Incorporating

Safety into Long-Range Transportation Planning,” began in October of 2002 and is scheduled for completion in January of 2004.

His research team includes CEEM assistant professor Dr. Mark Hickman, two CEEM graduate students (Sudeshna Mitra and Ashley Chang) and Dr. Michael Meyer, a professor from Georgia Tech who serves as project co-principal investigator.

The research team will develop a manual that will be used by planners

and engineers in various Departments of Transportation (DOTs) and Metropolitan Planning Organizations (MPOs) throughout the United States to enable the explicit consideration of transportation safety in the current transportation planning framework.

“These characteristics of a safety conscious transportation planning process will undoubtedly result in important changes in the way transportation planning is conducted,” said Washington.

Continued on Page 8

Student SCE activities in 2002-03

CEEM's student chapter of the Society of Civil Engineers (SCE) is active in competing in regional conferences, sponsoring an annual career night for engineering students, adopting a highway, and promoting professional engineering examinations through the Arizona Board of Registration. In addition, the members of SCE are active in recruiting new students to the department.

SCE placed third overall in the Pacific Southwest Regional Conference this year. Seventeen universities competed in Tempe, AZ, on April 3-5, 2003. Approximately 40 members of the student chapter drove to Tempe, plus many others volunteered their time prior to the competition.

"It was a lot of fun but exhausting. We learned a lot about engineering, people and deadlines. It's all about working together as a team," said Stephanie Ruebush, the 2003 conference chair.

In April of 2002, SCE placed second overall in the annual conference, which was held in Irvine, CA. They won first place in the new seismic design event. Using a reverse-pyramid design, the students built an 11-foot building with a "shake" table that simulated earthquakes. They also won first place in the concrete canoe display event.

"Last year, we had high point values in the big events, such as the seismic design, concrete canoe and steel bridge. However, this year, the bridge failed and our canoe broke.



Members of the UA Student Chapter of SCE at the Pacific Southwest Regional Conference

We did quite well in the smaller point events and, as a result, we achieved a third place overall ranking," said Ruebush.

"It's definitely a rewarding experience every time we go to the competition. Each SCE participant contributes lots of energy and enthusiasm behind the projects so that the overall

product comes together," Ruebush added.

In the fall of 2002, our students became the national SCE "College Bowl champions" when they won first place at the annual competition/meeting at the University Marriott in Tucson. They also received the 2002 Certificate of Commendation from the

national SCE Committee on Student Activities.

The next regional conference will be held the first weekend in April of 2004 at Cal Poly-San Luis Obispo. Each year, various sponsors from our local engineering community help finance the competition and donate materials.

2002-2003 CEEM Student Scholarships

Scholarship	Student Recipient
Harold Ashton Scholarship	Melissa Cox, Scott Freestone, Lonnette Hemmings
W.E. Barnum Scholarship	Darlene Danehy, Kathryn Goble
Beavers Heavy Construction Scholarship	Juan Lopez
CH2M Hill Scholarship	Chris Cherry
Robert Cook Scholarship	Jennifer Marich
G & M Fremming Scholarship	Brandon Phillips, Kerry Ruiz
R.A. Jimenez Highway Scholarship	Ashley Chang
Quentin Mees Scholarship	Nathan Palmer, Carlos Sanchez Soria
J. Mellen Scholarship	Ian Cameron
Carl Meng Scholarship	Thuy-Diem Duong
Phillip B. Newlin Scholarship	Brooke Morton
Gerald A. Oliver Scholarship	Dorine Pfeifer
Osborn Scholarship	Brett Hoornaert
John C. Park Scholarship	David Roncayolo
Jane Rider Scholarship	Melissa Cox, Darlene Danehy, Lonnette Hemmings, Laura McPhee, Dorine Pfeifer, Kerry Ruiz, Stephanie Wilhardt
Paul Robinson Scholarship	Megan Humphreys, Elizabeth McGehee, Laura McPhee, Kimberly Steward
Rukkila Scholarship	Nathan Palmer, Brandon Phillips
J. Ruthrauff Scholarship	Ian Cameron, Andrew Desautels, Matthew Switanek
Schramm Scholarship	Nathan Palmer
Structural Engineering Assn. Scholarship	David Roncayolo, Brandon Phillips, Darlene Danehy
John S. Sundt Scholarship	Brandon Phillips, Eric Sturtz
Western Coal Transportation Scholarship	Jodi Pfab
Glenn A. Wildman Scholarship	Alexis Pedrego, Matthew Switanek
Wilson Scholarship	Jodi Pfab

Alumni Industry Council advises department

The CEEM Alumni Industry Council (AIC) has 32 members who volunteer their time by providing advice and support to the department from an industry perspective. Many of these members are alums of CEEM who now work in various companies and agencies such as Bechtel, MMLA, Nevada Energy Buyers Network, Pima County Transportation & Wastewater Management and Tucson Electric Power Company. They travel to Tucson to attend AIC meetings from as far away as New York City; Walnut Creek and Lafayette, CA; Arlington and Austin, TX; Las Vegas, NV; and, several major cities in Arizona including Yuma, Phoenix and Flagstaff.

Newly elected officers include Ed Nowatzki (co-chair), Tom McGovern (vice chair), and Kathleen Chavez (secretary/treasurer). Juan Valdés continues as the other co-chair for his position as head of CEEM.

Dave Turner received an award at AIC's February 2003 meeting for his



(l to r) Ed Nowatzki, Dave Turner (holding clock) and Juan Valdés

dedication and time spent as former chair during the past three years.

AIC is currently participating in various ongoing projects such as the development of an internship program and future fundraising activities.

Other current AIC members include David Areghini, James Attebery, Bob Barksdale, Michael Barton, Paul Cella, Seth Chalmers, Corky

Collins, Jim Davey, Jim DeGrood, Thomas Draeger, John Evans, Charles Gajda, Joe Gervasio, David Gildersleeve, William Palmer, Clinton Parker, Claudia Perchinelli, Raul Pina, Robert Rasmussen, Subhash Raval, Blaine Reely, Roberto Ruiz, Mark Smith, Robin West, Mark Woodson, Bob Wortman and Ken Wright.

Retirement

Professor Dinshaw Contractor



retired in May of 2003 after 22 years in the CEEM Department. From 1994 to 1996, he was the department head. In addition, he was the acting head of the department from 1991 to 1994.

Contractor earned his MS in Mechanics and Hydraulics in 1959 at State University of Iowa in Iowa City and his PhD in 1963 at the University of Michigan in Ann Arbor.

Prior to his UA faculty appointment, Contractor worked at the Indian Institute of Science in Bangalore, India;

HYDRONAUTICS, Inc., in Laurel, MD; and, the Virginia Polytechnic Institute & State University in Blacksburg, VA. In addition, he consulted with various companies in Virginia, Maryland, Guam and India from 1969 to 1995.

Specializing in water resources, numerical computation, and surface and groundwater flow, Contractor attended many conferences and wrote numerous publications and technical reports. During his career, he made at least 43 presentations and participated in 24 research projects. In 1994, he was awarded the Robert J. McGrattan Literature Award for co-authoring (with Dr. A.S. El-Ansary) the

Outstanding Paper, "Valve Closure: Method for Controlling Transients," in the ASME Journal of Pressure Vessel Technology.

Friends

Continued from Page 3

AIC identifies projects that the Friends will pursue in the future and vice versa. Many members of the FOD are also involved with the AIC. Current Friends include Bob Bambauer, Michael Barton, James Degrood, Tom McGovern, Ed Nowatzki, Claudia Perchinelli, Raul Pina, Blaine Reely, Bob Suarez, David Turner, Stan Turney and Juan Valdés.

Student Profile

High school student interned in lab

During the 2001-2002 academic year, high schooler Ricardo Gradillas worked with Robert Fleischman, assistant professor in CEEM, to build a massive, 20-foot-tall test rig designed to simulate heavy loads that steel-frame buildings experience during earthquakes.

As a senior at University High, Gradillas participated in the Professional Internship Program (PIP) headed by Frazier Barbery of the Tucson Unified School District, which places about 250 high school seniors with local professionals each semester. The selected students work in university research labs, hospitals, and other locales where they learn about the career paths they have chosen.

Funded under a grant from the National Science Foundation, Fleischman's project involves a reaction frame with large I-beams and a hydraulic actuator with a 110-ton load capacity. The reaction frame tests new connection forms that join columns and beams. The junctions of columns and beams are usually the weakest areas in steel-frame buildings, and these new connectors are designed to withstand earthquake stresses without breaking apart.

During his internship with Fleischman, Gradillas learned about designs and various equipment including saws, drills, and soldering irons. He spent approximately 7.5 hours each week working with graduate



Ricardo Gradillas

students.

"I have a lot of personal responsibility here," Gradillas said. "I get to see what it's like to work in a research lab. I signed up because I like math and science and enjoy building things."

"The internship program gives students an accurate and realistic idea of the day-to-day activities in a particular profession," added Barbery. "As a result, the students either end up pursuing the internship with lots of energy or they realize they are not suited for the career."

Gradillas, a National Merit Scholar and Flinn Scholar, chose the CEEM Department to pursue his higher education studies. He completed his freshman year at the UA in May 2003 and interned at RS Engineering this past summer.

CEEM develops new internship

CEEM is developing an internship that will provide opportunities for students to gain professional and/or technical development while integrating classroom learning with practical work experience. Listed on official UA transcripts, the internship will be taken for credit but not count towards any degree requirements.

Modeled from a Cal Poly-San Luis Obispo cooperative education program, CEEM's internship will provide invaluable experience to student interns who become familiar with the way engineering companies work. They will receive pay based on 60-70% of a newly hired employee's salary.

CEEM students can enroll in a full-time, six-month internship for the spring and summer sessions or for the summer and fall sessions. Interns should research various companies to determine the likelihood of a successful match.

The interns will complete monthly progress reports (15% of the student's final grade) and a professional report (30%). In addition, the intern's supervisor will conduct an evaluation worth 30% of the final grade. The remaining portion of the final grade will be derived from a work information form, student evaluation and a debriefing/evaluation with the faculty advisor.

In Memoriam



Gene Nordby, 76, died May 13, 2002, in Denver, CO. He was a professor and then head of the UA Civil Engineering Department from 1958 to 1962.

Nordby left Tucson from 1962 to 1985. During this time period, he was dean of engineering and then vice president of administration and finance at the University of Oklahoma, vice president for business and finance at Georgia Institute of Technology, and chancellor at the University of Colorado – Denver.

Nordby returned to Tucson in 1986 as department head for Agricultural and Biosystems Engineering until he retired in 1994.

Thank You!

This issue of *Arizona Civil View* has been printed thanks to the generosity of the Salt River Project in Tempe, Az.

Transportation

Continued from Page 4

Incorporating safety in planning is required by federal law; however, at this time there is little guidance available on how to conduct “safety conscious planning.” The safety conscious planning framework that the U A and Georgia Tech develop will include the following characteristics:

- The planning process will allow decision-makers to explicitly and proactively consider trade-offs between investments in infrastructure improvements and expansion, maintenance, rehabilitation and safety.
- Safety strategies will be considered and implemented at local, regional and statewide scales of application.
- Safety concerns will focus on short, intermediate and long-range timeframes.
- A “safety level of service” (LOS) or “safety rating” will be used as a performance measure—much like pavement condition, roadway LOS, and transit LOS—in decision processes that occur at state, regional and local levels.
- Vertical and lateral communication among technical experts and decision makers in safety, planning and programming will be enhanced.
- A range of analytical tools will be integrated so that DOTs, MPOs and Governors’ Offices of Highway Safety Representatives can conduct safety conscious planning.
- A wide geographic and agency representation, participation and cooperation will occur during critical phases of plan development, maximizing the chances for wide-spread implementation.
- Transportation safety will be considered from a broad perspective, including geometric design, land-use zoning, human factors and educational programs.
- Finally, transportation planning will explicitly consider the safety impacts of all urban transportation users, including rural and urban motorists, motor carriers, transit users, bicyclists and pedestrians.

Write to Us!

If you have an interesting event that you want to share with former classmates and friends, please send a letter with an update on your activities to:

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Tucson, AZ 85721-0072
Or e-mail: jvaldes@u.arizona.edu

Please include your name, degree (BS, MS, PhD), year of graduation, address, home and/or business phone number, e-mail, and your current employment information. Thanks!

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