

One Hundred Years Celebration in Progress

The Department of Civil Engineering and Engineering Mechanics (CEEM) is busy planning its 2005 centennial celebration. With a theme of "One Hundred Years of Building Our Foundation," the centennial will include many events throughout the year to celebrate the department's successes over the past 100 years. A gala celebration will be held on November 4, 2005, in conjunction with Homecoming and the American Society of Civil Engineers Arizona section meeting.

In addition, the department is accepting nominations for two awards, Distinguished Alumni and Young Outstanding Alumni, to be given during the gala celebration. Nomination forms, eligibility requirements and award criteria are posted on the department's website: <http://civil.web.arizona.edu/Centennial/AlumniAwards.html>

The Centennial Steering Committee, which was organized last year, has established several subcommittees: History and Heritage, Distinguished Alumni, Fund Raising, Communications, Alumni Events and the Gala Celebration. These groups are currently coordinating specific centennial activities.

Centennial events will occur throughout this year in various geographical areas, such as Phoenix, that have a large number of alumni.

The department would like to thank its centennial sponsors:

- Dave Turner ('58), former chair of the UA Civil Engineering Alumni Industry Council (AIC)



Steering Committee members (l to r): Steve Pageau, Juan Lopez, Kimberly Steward, Mike Barton, Belle Tom, Ed Nowatzki, Alice Stilwell, Tom McGovern, Molly Ankney, Beth Weaver, Kevin Lansey

- Gervasio and Associates, Inc.
– Joe Gervasio ('57)
- MMLA Psomas, Inc.
– Tom McGovern ('74), AIC chair
- Salt River Project
– David Areghini ('65)
- Woodson Engineering – John ('03) and Mark ('79) Woodson
- M3 Engineering & Technology
– Dan Neff ('73)
- Sundt Construction Co.
- HDR Engineering, Inc.
– Rob Turton ('87)
- Castro Engineering
– Frank Castro ('78)
- Kiewit Western Co.
– Dennis Grenier ('76)
- Sargent & Lundy – Bud Wendorf
- The Industrial Co. – Dick Hall

In addition, Professor Emeritus David Hall has established the David J. and Mickie Hall Endowed Scholarship to benefit civil engineering students.

"It (the centennial celebration) should help in recruiting quality students by showing that we have not only a future but a past," said Dave Turner.

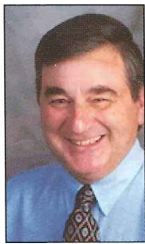
Visit the CEEM website at <http://civil.web.arizona.edu> to find ongoing information regarding the committees, how to become a sponsor and the current status of centennial celebration activities.

"This is a big event and, not to be trite, it only occurs once," said David Turner.

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Centennial Celebration

One Hundred Years of Building Our Foundation

Highlights from this year

By Juan B. Valdés, CEEM Head

The Department of Civil Engineering and Engineering Mechanics was established 100 years ago and is one of the first continuing departments on campus to celebrate its 100 years of existence. Emeritus and current faculty, staff, students, alumni and community engineers are joining forces to plan a gala event during Homecoming 2005 to acknowledge past accomplishments via a centennial celebration.

In addition, we are planning a number of other activities in 2005 to celebrate those highly successful 100 years as we look forward to building our future. For example, we have Centennial Steering Committee members who are coordinating various activities—such as reunions, BBQs, dinners and cocktails—in Phoenix, Tucson, San Diego, Las Vegas, and San Francisco. I welcome all our alumni to become involved with our centennial celebration by attending any of these events and investing in our vision of

the future.

In order to accomplish our primary goal of preparing our graduates to enter the work force through a rich educational environment, we depend on the generous contributions of benefactors such as corporate donors, friends of the department and faculty, as well as current and past students and their parents. Our fundraising efforts over the next year will assist us in establishing an endowment for the department to be used for student support, professor retention, facility upgrades, etc.

I ask all alumni and other interested friends to consider becoming involved in the centennial celebration and beyond.

Clearly, we have much to be proud of as individuals and as a department. Congratulations to all of our graduates for making the UA Department of Civil Engineering and Engineering Mechanics a flagship department that we all can be proud to acknowledge.

Centennial Statistics

The first UA civil engineer, Frank Caleb Kelton, actually graduated one year before the department was formally established in 1905; he later became head of the department for 20 years from 1922 until 1942.

Our fourth graduate was a woman, Jane Rider (1911), for whom one of our scholarships is named. She received her M.S. degree in 1930.

Alfred Micotti earned the first UA civil engineering M.S. degree in 1915; he received his B.S. degree in 1914. Jerome Burns, who received his B.S. degree in Mining Engineering in 1959, received CEEM's first Ph.D. in 1965.

Since the inception of the department, more than 3,100 students have completed their degrees in civil engineering or engineering mechanics at the University of Arizona. Many of our graduates have gone on to long and successful careers in engineering practice in both the public and private sectors and in academia, as well. Some of our graduates have had equally successful careers in other professions.

ASCE Recognition

The American Society of Civil Engineers has given recognition certificates to the following engineers affiliated with our department:

- Tom McGovern, vice president/regional manager of MMLA PSOMAS, is an alumnus and active member of two departmental committees: the Alumni Industry Council and the Friends of the Department. He is also on the Centennial Steering Committee.

- Jack Buchanan, who is employed at WLB Group, is an adjunct professor who teaches *CE251: Elementary Surveying* for the department.
- Richard Martinez, who works in the Planning and Engineering Division of Tucson Water, is an alumnus who has donated his time during Engineering Week and has participated as an evaluator of student proposal presentations in CE 408: *Issues in Professional Engineering Practice*.

The ARIZONA

Civil View

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The *Civil View* is written by The University of Arizona Civil Engineering and Engineering Mechanics Department to discuss research, student activities and other CEEM news. Its purpose is to foster communication between alumni, faculty, students, staff and friends of the department.

Editor/Writer: Susan Kinsey

Genevieve Morrill

Genevieve Atwood Morrill attended The University of Arizona during the late 1930s as one of CEEM's first female engineering students. She is still active in the department and college, and has attended both the Homecoming Engineering Breakfast and the annual scholarship reception. In addition, she has created a scholarship in memory of her late husband, the Reverend Elbridge Morrill.

Married 61 years, Genevieve and Elbridge met at the UA while attending engineering classes in 1937-38. They left school together when he was recalled to active military duty. They both graduated from the University of Missouri-Columbia with a B.S. in civil engineering in 1948. Genevieve was the only female engineering graduate in her class.

Elbridge later earned a master's degree in Public Health-Industrial Hygiene Engineering from the University of California, Berkeley, in 1951. He worked for the Utah Public Health Department, U.S. Department of Defense in Japan, and the U.S. Public Health Service. In addition, Elbridge was retired as a lieutenant colonel in the U.S. Air Force.

After Genevieve earned her bachelor's degree in engineering, she moved to San Antonio and was hired by the Texas highway system to work on the first freeways. Then she worked in the state freeway systems in the San Francisco Bay area of California and in Utah. She also taught engineering for one year at Westminster College in Salt Lake City before moving to Japan with her husband. She never re-entered the engineering job market



Genevieve Morrill

because the pay offers were too low and she would have to travel extensively.

"I never had any problems—other than two professors—being a female in a male-dominated career. People you worked with accepted you. I carried surveying equipment just like the men and was treated the same. I think women in the western U.S. were accepted more as equals than in other parts of the country, because females had been involved in the settlement of the West and were always a vital part of its history.

"However, in 1950 I interviewed for a job at Bechtel for an entire hour," said Genevieve.

"The interviewer said he'd hire me right then, but the company had a policy that they wouldn't hire women engineers. When asked why he even scheduled an interview with me, the interviewer told me he spent the time

"My advice to other females entering the engineering field today: don't let anyone discourage you"

talking with me because he was interested in learning why a woman would go into this field. Now, after the equal rights amendment, people can't believe that companies had that attitude. This was one of the reasons why I worked for various state systems for 4-5 years—they were willing to hire women."

"No one I knew was surprised when I selected engineering as a career," said Genevieve. "When I was two or three years of age, I would go outside to climb over machinery. When I was four or five, I overheard one of my father's engineering friends talk about paving Monroe Street in Phoenix the next day. I expressed an interest and was told to join him at 3 am, which I did!"

When Genevieve attended the UA in the late 1930s, the Civil Engineering Department had two other female students and only four women in the college. Only 2,000 students were enrolled in the entire university at that time.

"My advice to other females entering the engineering field today: don't let anyone discourage you," said Genevieve. "I had encouragement from my family and father's engineering friends who told me to go ahead and do it (get a degree in engineering) if that's what I wanted to do. Now, my nephew likes to shock his friends when he tells them that his aunt worked as an engineer before computers were used!"

Student Profiles

ASCE Activities



Seismic group



Steel bridge team

The Committee on Student Activities of the American Society of Civil Engineers selected the UA ASCE Student Chapter to receive a Letter of Honorable Mention for its outstanding activities during 2003. Earl Tast, chair of the ASCE Committee on Student Activities, wrote: "The Chapter's accomplishments reflect the enthusiasm and hard work of your student officers and members, as well as Scott Merry's fine guidance as faculty advisor. Everyone who had a part in this endeavor should be justifiably

proud of his or her contribution to the development of the future of civil engineering."

During the 2004-05 academic school year, ASCE student activities include:

- Adopt-A-Highway on a one-mile stretch of highway on Oracle Road
- Attend various activities that the department and the college sponsor to promote civil engineering and introduce SCE to freshman
- Biweekly meetings with speakers from industry who discuss opportu-

nities for students after graduation

- Career Night was held Wednesday, October 27, 2004; over 30 companies attended this event. Early each fall, SCE sends numerous invitation to industry asking for their participation
- The next Pacific Southwest Regional Conference (PSWRC) will be held in April of 2005 at Cal State-Fullerton in Fullerton, CA. Approximately 40 students usually attend from CEEM.

Brandon Phillips

Brandon Phillips received the Outstanding CEEM Student Award at the spring CEEM precommencement held at Gallagher Theater in the Student Union on May 14, 2004.

Brandon, who was raised in the Phoenix area, entered the UA in the fall of 2000. Brandon always maintained a 4.0 grade point average, not only in college but in elementary and high school, too. He never received a "B" grade! He is particularly proud that he was a National Merit Scholar in high school.

Brandon was captain of the steel bridge contest at the 2004 SCE competition between 17 universities. His team placed 2nd overall; as a result, his group went to the nationals at the

Colorado School of Mines in Golden, CO, on May 28-29, 2004.

Brandon was an active member of Tau Beta Pi, the National Engineering Honor Society at the UA. He was an Arizona Ambassador and gave tours of the UA campus to athletes and incoming students. He also went out of town to recruit new students. He especially enjoyed meeting the Phoenix outstanding high school juniors receiving scholarships to go to the UA, since he was a past recipient a few years ago.

Upon graduation, Brandon accepted a job with Exxon Mobil in Houston, TX, where he is a project manager in a cost and scheduling group. Eventually, he might want to pursue an MBA to get into the business aspect of engineering, instead of design.

Results of 2004 PSWRC at Cal Poly San Louis Obispo

Overall, the UA took third place with the following individual rankings:

Concrete Canoe	4th place
Steel Bridge	7th place
Seismic Design	1st place
Technical Paper	1st place
Surveying	3rd place
Construction Bid	3rd place
Quiz Bowl	2nd place
Tug-O-War	3rd place

This Canoe is Cast in Concrete

By Ed Stiles

How can a concrete canoe float in water? With the help of sophisticated computer tools, esoteric concrete mixtures and a good deal of clever design, concrete canoes not only float but they perform very well on both straight and slalom courses.

University of Arizona civil engineering students have raced concrete canoes for the past several years in the American Society of Civil Engineers' western regional conference. In 2004, they used an innovative design to finish fourth among 17 entries.

The UA team also finished second, just one percentage point behind the winning team, when their canoe was judged for aesthetics and durability.

UA's canoe uses pre-tensioned carbon fiber ribbons to give it strength and rigidity. This is only the first or second time pre-tensioned carbon fibers have been used in the western conference, although some midwestern schools have used the technique in the past.

Pre-tensioning adds strength to concrete, in essence pushing it together, opposing the formation of cracks.

Civil engineering senior Bill Hanson, UA's team captain and chief



Bill Hanson, team captain and chief designer, stands next to a model of the racing canoe named "Fast-Az-U."



Finished concrete canoe with presentation team

designer, noted that using pre-stressed carbon fibers on a curved shape, such as a canoe hull, takes some careful planning.

The students first built a mold by placing wooden cross sections every three inches along a central backbone and linking the cross sections with Styrofoam. The finished mold looked like the outside hull of a canoe.

Then they poured the first 1/4-inch-thick layer of concrete over this mold. The students used a special mix that included plasticizers to make it flow smoothly. The concrete mix hardened to be lighter than water, meaning that a chunk of canoe concrete actually floats.

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Cassandra Dickerman

Cassandra Dickerman received the Outstanding CEEM Student Award at the fall CEEM precommencement ceremony in December 2004.

During the past four years, Cassandra participated in many activities including leadership workshops, women leadership development conferences, intramural soccer, and volunteer work for the Salvation Army.

She was involved with SCE for the past three years on the steel bridge team, concrete canoe team and co-captain of construction bid. She worked summer internships with Parsons Transportation Group and ExxonMobil, and for the past three years worked as an intern with HDR.

She graduated with a dual degree in civil engineering and engineering management, and a minor in math. Cassandra accepted a job with Exxon-

Mobil as a facilities engineer.

She said, "In our major (CEEM), we have excellent teachers who actually get to know their students. These teachers actually force us to learn instead of how to regurgitate the information. Best of all, we know our classmates. A lot of my college memories will include SCE, the fun times in the courtyard and, most of all, the conferences."

UA Professor and Student Use Fiber Reinforced Polymers



A retrofitted beam in the Coolidge Roundhouse Gymnasium is fully encased with a carbon-fiber covering

Another idea involved adding more horizontal beams below the floor, which would have been costly and difficult to install.

Civil Engineering Professor Mohammad Ehsani developed a structural engineering technology using Fiber Reinforced Polymers (FRPs) to strengthen concrete beams and columns, to reinforce masonry walls, and to retrofit large pipes. This process has been used in California to help masonry structures resist earthquakes, and in Arizona to strengthen floors in local hospitals and to line pipes for the Central Arizona Project.

Ehsani and fellow CEEM Professor Hamid Saadatmanesh pioneered the use of FRPs in construction beginning with a 1986 exploratory research grant from the National Science Foundation, which was then followed by a patent.

FRPs, which are similar to fiberglass, enabled the Coolidge School District to add elevated bleacher seating to its Roundhouse Gymnasium at minimal cost and disruption to school activities. School officials found that the second floor of the building would not support the weight of bleachers, as well as spectators, without being reinforced. Ehsani worked on this project with a CEEM master's student, Nathan Palmer, who had played on the Coolidge basketball team just a few years ago while in high school.

One preliminary solution involved placing vertical columns under the floor, which would have lessened the space in the locker rooms.

Ehsani's plan, which was accepted by the school, involved placing the bleachers on top of existing locker rooms. As a result, spectators were moved off the gym floor to provide them with better viewing of sporting events, such as basketball.

Ehsani and Palmer tested glue laminated (glulam) wooden beams similar to those used in the Roundhouse Gymnasium. To measure forces, they used strain gauges mounted on both an unmodified beam and then on a second beam reinforced with FRP materials. They determined that the reinforced beam was 67% stronger than the unmodified one. The final results of this project showed that the gym's floors—originally designed for loads up to 40 pounds per square foot—can now handle loads up to 60 pounds per square foot.

"The greatest pleasure for one's professional career is to have dreamt of some solution, pioneered the field and then be lucky enough to be alive to see that it gets used," Ehsani said. "It's just a real joy when I drive by some building and I see that we actually strengthened it with something that came out of our lab."

By working closely with practicing engineers, Ehsani said he has gained a deeper understanding of factors that are important in industry but may not be important in the lab.

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UA Professor and Student Brief Congressional Staff

By Ed Stiles

UA Civil Engineering Professor Muniram Budhu and Gillian O'Brien, an undergraduate in geological engineering, went to Washington, DC on May 20, 2004, to brief about 50 congressional staff members on UA's GROW Digital Library Project and the National Science Digital Library (NSDL).

GROW (Geotechnical, Rock and Water Resources Library) is a portal web site that directs readers to civil engineering-related web sites that already have been reviewed for content and accuracy by the GROW committee. The GROW site also includes animated labs, interactive course work, videos of engineering labs and other resources. Its original National Science Foundation (NSF) funding ended in August of 2004, but GROW has received additional funding from other sources. In addition, Budhu is submitting a new NSF proposal that will expand GROW to cover the entire College of Engineering.

The GROW interactive labs offer UA students an intuitive drag-and-drop interface that allows them to perform virtual lab experiments. Students can work at their own pace on their own time schedule, since the lab is always open.

The GROW team includes UA faculty and appointed personnel from Civil Engineering, Mining and Geological Engineering, Agricultural and Biosystems Engineering, University Library, Science-Engineering Library, Information Resources and Library Sciences, and Computing and Information Technology.

For more information, please contact the GROW website at <http://www.grow.arizona.edu>

Centennial's History & Heritage Committee Reunites Retired Faculty

The History and Heritage Committee was created to write and publish a commemorative brochure, based on available historic resources, that presents a written and pictorial review of the department's history since 1905. Sale of the brochure is intended to be a fundraiser for the department. It will contain approximately 100 pages of text with black-and-white photos. Other materials—such as photos of places, events, groups of unidentified people, etc.—will be included in a CD placed inside the brochure.

The History and Heritage Committee meets once a month at El Parador Restaurant to discuss agenda items and focus on upcoming assignments. Members were selected to participate in this committee because of their past experiences and personal recollections of the department years ago. Their personal stories, with photos and documentation, will be the major portion of the brochure. Committee members include five Civil Engineering & Engineering Mechanics (CEEM) alumni, a current graduate student representative and 14 emeritus faculty members.

The brochure will include information on the following topics: a history of the department, alumni, building locations, enrollment, faculty, department heads, graduate programs, faculty awards and dinners, undergraduate student activities, changing

curriculum, and cost comparisons over several decades.

One committee member, Haaron Miklofsky, found a canister of vintage film that showed the department during the early 1970s. The film was converted into a DVD format for viewing during the centennial gala. It was narrated by Professors Quentin Mees and Miklofsky, in addition to Nancy Barberii, Dr. Miklofsky's faculty assistant from Architecture.

Various CEEM labs were highlighted in the film that showed strain gauges, pure oxygen and air studies, traffic controllers, micro-materials studies using an electron microscope, and air pollution studies done on the roof of the Civil Engineering Building. In addition, the film discussed the design of McKale Center, which is where the UA basketball games and other sporting events take place. It also showed a mechanics class taught by Dr. Don DeDeppo, a radiation shielding class on radioactivity, and Dr. Allan Malvick's solid mechanics class.

The film also discussed field trips usually taken by two or three busloads of CEEM students to determine how civil engineering knowledge is used in industry. Along with Professor Robert Wortman, the students visited a steel mill in Phoenix to look at a vacuum machine. They also visited the Arizona State Highway Department to view a water purification plant to determine



History and Heritage Committee members (l to r): Dinshaw Contractor, Ed Nowatzki, Rudy Jimenez, Haaren Miklofsky, Jim Barber (chair)

the process of making clear drinking water. In addition, they went to some proving grounds to test defects in machine design for safety issues and to view how earth-moving equipment can travel on a 60% slope.

Various committee members plan to conduct research at the Special Collections area of the UA Main Library to gather additional information from old yearbooks, phonebooks, annual reports from previous department heads and other resources, such as Douglas Martin's "Lamp in the Desert."

So far, committee members have collected old newspaper clippings, a slide rule, awards, photos, notes and civil engineering books. If anyone wishes to donate or loan additional items—including old textbooks, calculation devices, surveying devices and lab equipment—for viewing in a CEEM repository during Homecoming 2005, please contact the CEEM department. They are also seeking old photographs, as well as amusing stories and memories, to be included in the brochure.

Concrete Canoe

Continued from page 5

Next, they placed fiberglass mesh over the first layer and worked in a little more concrete to hold it in place. Then they let the concrete harden just enough to prevent a layer of carbon fiber ribbons from cutting into the concrete or the mold beneath it. The carbon fiber ribbons were placed lengthwise along the canoe on top of the mesh and tensioned to about 80 pounds.

After that, the students spread another layer of concrete on top of the carbon fibers, and followed that with another layer of fiberglass mesh. The canoe was then finished with a final outer layer of concrete.

After the concrete set, the students spent about 100 hours tediously patching and sanding until the hull was as smooth as one made from fiberglass.

Before all this happened, Hanson and a few other students spent a lot of

time at the computer doing structural analysis, searching for the best combination of design tradeoffs that would give them the strongest, lightest and fastest design for both the two- and four-person races.

In addition to its high placing in the conference, the concrete canoe team also won the Best Civil Engineering Design Award in May 2004 at the UA's Engineering Design Day.

Faculty Awards

In Memoriam

Roger Turk ('59), 70, died September 20, 2004. He was an adjunct faculty member in the Department of Civil Engineering & Engineering Mechanics teaching structural engineering courses. He also operated his own consulting engineering firm since 1966. He retired as a commander in the Naval Reserve after serving 30 years. In addition to being a member of numerous national and international organizations, Turk was a life member of the Structural Engineers Association of Arizona and a life member of the American Society of Civil Engineers.

Reinforced Polymers

Continued from page 6

"The aesthetics—the smell, how much dust is generated and similar issues—are often critical to contractors," said Ehsani.

"The ability to quickly complete the job and move out is also important to contractors. In the lab, these issues are usually not as important. Now, I have incorporated these factors in our research and include these concepts when teaching my classes."

Robert Fleischman

2004 Martin P. Korn Award and

2004 George D. Nasser Award

Awarded from the Precast/Prestressed Concrete Institute (PCI).

Dr. Achintya Haldar

2004 Graduate Advisor of the Year

Awarded by the Graduate and Professional Student Council, The University of Arizona.

2004 Award for Excellence at the Student Interface

Awarded by the College of Engineering, The University of Arizona.

2004 Outstanding Faculty Member Award

Presented for exceptional performance rendered during the graduating classes'

years in Civil Engineering at The University of Arizona.

Dr. Mark Hickman

2004 Professor of the Year

Selected by the student chapter of the Society of Civil Engineers at The University of Arizona

Tribikram Kundu

Best Paper Award 2004

Awarded by International Society of Optical Engineers (SPIE).

Invited Professor 2004

Awarded by the Electrical Engineering Department, Ecole Normale Supérieure de Cachan, France.

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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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!

The University of Arizona

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