



COLLEGE OF  
ENGINEERING,  
ARCHITECTURE AND  
TECHNOLOGY

A young woman with long, wavy brown hair is rowing a boat on a body of water. She is wearing a white t-shirt and is captured in a focused, athletic pose, holding a wooden oar. The background is a soft-focus view of the water and sky.

# Perfecting the Student Experience

# GLEANINGS FROM THE DEAN

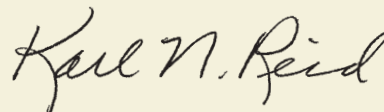
Like the splendid oak tree that takes years to mature and lives through the generations, constructing a new building is a slow and sometimes painful process. But the “dream” of a third of a century is becoming a “reality” as the Advanced Technology Research Center nears completion. The investment will have an incredible effect on thousands of young people who study engineering at OSU. In this edition of *IMPACT*, you will read about one example of how this unique facility is enhancing the undergraduate experience.

Most of this issue focuses on students and the student experience in engineering, architecture and technology at OSU. I am a firm believer that a college education is more than a series of courses and exams to be taken. It is a series of experiences inside and outside the classroom, a time of development of attitudes and directions, a time of maturing, a time of reaffirming values most likely gained from parents and friends, and a time of investment in the future.

The special focus in this issue is about young people who have undergone enormous change in the four or five years since they entered OSU to begin their investment in the future. It talks about the experiences they have had in all areas of their college careers. It points to the value that can be added to an education through various types of enrichment and leadership development experiences.

The stories and photographs of the concrete canoe team, the Mini-Baja project (see photo, this page), the Hispanic student design team, the fourth-year architecture students, Clark Ferguson, Todd Haines, Brian Powell, Wendy Rachel and Mark Paden are wonderful! They represent only a few examples of how enrichment experiences have made a difference in the intellectual and leadership development of our students. Read also about the new Phillips Engineering Scholars program and how it will add another new dimension of enrichment outside the classroom.

We are involved in the business of developing technical leadership for the future, and we are proud of our success and our *IMPACT*. If you are a graduate or directly associated with the college, I know that you will share our pride.



Karl Reid, Dean  
College of Engineering, Architecture and Technology



Enrichment opportunities abound in the College of Engineering, Architecture and Technology, and new student projects like the MAE-backed Mini-Baja team get started each year. CEAT Dean Karl Reid is pictured with the 1997 team, Jack Nichols (right) and John Hartwig, and their car that placed ninth out of more than 80 entries in a national contest this summer.

# I M P A C T

VOLUME 4, 1997



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*Small Project, Big Appeal — page 13*

## UNDERGRADUATES, TOO

The new Advanced Technology Research Center has enough room for all students to learn.

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CEAT realizes the student experience entails more than sitting at a desk in a classroom.

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## SCALING BACK

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IMPACT is a publication of the Oklahoma State University College of Engineering, Architecture and Technology and is designed to provide information on college activities and accomplishments while fostering communication among the CEAT family and friends.

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This publication, issued by Oklahoma State University as authorized by the College of Engineering, Architecture and Technology, was printed by the Audio Visual Center, University Printing Services at a cost of \$18,750. 15M/September 1997/job# 9715.

## I M P A C T

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**ON THE COVER:** Wendy Rachel, former president of the OSU chapter of the American Society of Civil Engineers, paddles her way toward regional victory as the concrete canoe team chief this spring. See the related stories on pages 8 and 15.

## VIP INVITATION

The CEAT wants you to have access to up-to-date information on all the exciting things happening here, from the dedication of the Advanced Technology Research Center to the development of the new Phillips Engineering Scholars program.

We invite you to be our guest for a VIP visit to campus and the CEAT. Contact Dean Karl Reid by phone at (405) 744-5140, by FAX at (405) 744-7545, or by e-mail at [kreid@okway.okstate.edu](mailto:kreid@okway.okstate.edu). If a trip to campus isn't possible, visit the CEAT Website at: [master.ceat.okstate.edu](http://master.ceat.okstate.edu). The OSU homepage is located at: [www.okstate.edu](http://www.okstate.edu).

# ATRC *update*

## Undergraduates ‘Build’ Future in Research Center

“**T**he ATRC will be a place where problems are real and not bound by disciplines; where students, faculty and engineers from industry work as teams; and where technology provides the connection between state-of-the-art laboratories and classrooms at OSU and throughout the world,” said Karl Reid, dean of the College of Engineering, Architecture and Technology, at the groundbreaking Oct. 14, 1995.

Now that dream is a 165,000-square-foot reality. While the building’s true potential will be realized in years to come, one faculty member did not wait for the construction dust to settle before freeing his students from their dis-

ciplinary shackles and asking them to solve a “real” problem such as Reid described.

After spending the 1996-97 academic year as Freshman Research Scholars under Daniel Grischkowsky, Jeff Daniels and Jonathan Allen were hired by the Bellmon Professor of electrical and computer engineering to work as assistants on his research team. For the summer, both have worked full time as jacks-of-all-trades with Grischkowsky’s team of graduate students and post-doctoral fellows in the Center For Laser Research.

“We are whatever they need us to be,” says Allen, chemical engineer-

ing sophomore. “We take care of things they don’t have time for or don’t want to be bothered with, usually things that would be simple for them, but a challenge and good experience for us.”

The students’ responsibilities grew during the summer from ordering materials for the research team to light machining and actually building electronic components. As the ATRC neared completion, Grischkowsky gave the young men a special project that afforded them the opportunity to leave their own mark on the new building. Grischkowsky asked Daniels and Allen to develop heavy-duty, hanging shelves for one of his new labs in the ATRC.

“We had to design them, figure costs and loading capacities,” Daniels says. “Once we did that, we had to go to the engineers to determine what the ceilings could hold.”

The shelves, weighing approximately 1,200 pounds, would require a 2,000-pound load capacity to suspend lab equipment and electronics above new, very expensive stainless steel tables for optical research.

“If the ceiling could support all of our equipment was a pretty big issue,” Daniels says. “There was a lot of interaction between us and the engineers to see if our designs were compatible.”



Common spaces in the new Advanced Technology Research Center, dedicated Oct. 11, will facilitate interaction between students, faculty and engineers from industry, cutting across the lines of traditional academic disciplines.

# Cordell Makeover Yields Modern Learning Facilities

It was once part of a traditional men's dormitory, but now the center wing of Cordell Hall is home to state-of-the-art classrooms and laboratories for students of the College of Engineering, Architecture and Technology.

Renovated to offset space lost in the razing of Crutchfield Hall and the Industrial Arts building for the construction of the ATRC, Cordell Center now holds two-way video classrooms that connect to sites throughout the state, a new computer-aided design lab and an adjacent graphics lab, a freshman engineering design lab and space for graduate teaching associates.

Thanks to substantial gifts from several leading industrial firms, one of the labs contains modern equipment for students to explore precision motion control techniques.

Don Norvelle's fluid power technology laboratory includes six pneumatic and six hydraulic test stations. After adding programmable controllers from Womack Machine Supply of Tulsa to the test stations, Norvelle's students can simulate a wide variety of hydraulic and pneumatic systems used in industry and defense.

"Fluid and gas power systems are used in ship and aircraft flight control systems and can be found in heavy machinery and industrial plants as well as many other places where safety is a top priority," Norvelle says.

Vickers Inc. of Detroit donated the hydraulic stations and Parker Fluid Power of Cleveland gave the college the pneumatic stations. Although these two firms compete in the marketplace, they both express respect for the OSU program. Of 22 schools in the world recognized by the Fluid Power Education Foundation, OSU's mechanical technology program is one of only four that offers a four-year degree with an emphasis on fluid power control.

"Our students participate in coop programs all over the country while they are in school, and companies let us know they are good employees," Norvelle says. ▲



Test stations in Don Norvelle's fluid power laboratory in Cordell will benefit both students and Parker Fluid Power employees.

ADAM HUFFER

illustration/Colleen Beauchamp

Allen and Daniels had their design evaluated by engineers for the building, and the builder's Unistrut installation expert also looked it over.

"The shelves are made from something called Unistrut," Allen says. "They had already installed several Unistrut structures in the building, and they evaluated our design to see if we could in fact build it."

Allen and Daniels made a detailed schedule of materials they needed, ordered them and put the whole design together. Work on similar projects can only help undergraduates in their pursuit of degrees and employment, Grischkowsky says.

"When people talk about research, they don't think of undergraduates, but there's a tremendous amount of opportunity for undergraduates to work in the ATRC," Grischkowsky says.

Allen says that although that work may not include data recording or conducting experiments, it is nonetheless invaluable.

"Dr. Grischkowsky says we did something a little different than most research scholars," Allen says. "While we are doing actual work — that is not always thrilling — we're contributing to the team."

Daniels adds, "We do have projects that we work on, but he threw us into the lab and asked us to do real work to assist the team."

The professor has his reasons for doing so, he says. "This is a lot more than just a student experience," Grischkowsky

says. "They are assigned a project, and it's up to them to see that it is finished. They get a real world view of this.

"I don't necessarily want to hear about how hard they worked. Like most employers, I believe the emphasis should be based on results."

For Daniels and Allen, the projects will continue, and as their responsibilities grow, so do their roles on the research team.

"We still have our time to speak in the group meetings," Daniels says. "We also have the desk we share in the graduate office."

Allen excitedly adds, "There's supposed to be a new crop of Freshman Research Scholars coming in this fall who we get to train." ▲

ADAM HUFFER

# theCuttingEdge

## Global Eyes Focus on Web Handling Center

Since 1986, educators, researchers and industrialists from around the globe have fixed their sight on OSU, home of the world's first and only web handling research center.

Backed by 20 corporate sponsors — such as Polaroid, 3M and Xerox — and other organizations, the WHRC has been the site of research that translates to less-expensive, higher-quality products such as photographic film, newspapers, books, paper towels and beverage cans, says Karl Reid, dean of the College of Engineering, Architecture and Technology and director of the center.

“It is through web processing that we can make products better, faster and cheaper. Our sponsors rely on this to be competitive in the global marketplace,” Reid says.

The sponsors, who together account for billions of dollars worth of sales worldwide, evaluate results and advise on the center's future studies several times annually.

Recently, five of the sponsors served with WHRC staff members on a design team that developed a \$1 million high-speed web line which will be housed in the Advanced Technology Research Center. The line includes equipment donated by Rockwell Automation and the Fife Corporation. Keith Good, mechanical and aerospace engineering professor, led the design team.

“The web line will allow us to validate many of our analytical and computer-based models through controlled experiments,” Good says. “Our sponsors will then have more confidence in our research results and a better understanding of how they can use our results to produce a competitive advantage — better quality products and higher margin of profit.”

The WHRC has served as host of an International Conference on Web Handling every two years since 1991. The latest conference, held this summer on the campus in Stillwater, attracted 250 researchers and engineers from 14 countries. ▲

## Cowboys Saddle up for Military Work in Florida

Yes, there are cowboys in Florida. OSU Cowboys, that is.

For the past 30 years, the College of Engineering, Architecture and Technology has maintained its Engineering Research Field Office at Eglin Air Force Base, Fla., where data for the U.S. military's weapons effectiveness manuals, or “Orange Books,” is gathered.

OSU employs more than 40 full-time professionals at the Field Office to conduct research and develop, document and maintain sophisticated computer programs designed to produce classified conventional weapons effectiveness data.



After preparation in accordance with strict military standards, reproducible copy is sent to Tinker Air Force Base in Oklahoma for publishing of the Joint Munitions Effectiveness Manuals (JMEMs) and for their distribution throughout the military.

The latest staff endeavor is the production of hyperdocuments for distribution on CD-ROMs that provide quick access to munitions effectiveness data. In operations like Desert Storm, air-to-surface JMEMs have been used by the Air Force and Navy to optimize the effects of air strikes.

The Field Office was established in 1967 as the winning private contractor of the manuals for the Joint Technical Coordinating Group for Munitions Effectiveness, the committee responsible for munitions effectiveness research and documentation for all U.S. forces since 1964.

Several Eglin staff members have worked at the Field Office since the beginning, says James Wolff, Field Office director.

“In this very competitive research work where we must reapply for the contract every three to five years, it is extraordinary,” says Wolff, himself a 10-year employee. “There is a lot of loyalty for the university here.” ▲

STORIES THIS PAGE BY ADAM HUFFER

# 'Smart' Project To Bridge Economic, Safety Concerns

When OSU researchers unite and combine resources across departmental lines, truly amazing innovations occur.

The latest is the "smart bridge," a weather-predicting, self-heating overpass that also narrows the gap between cost-efficient maintenance and incessant safety improvements. The smart bridge literally has the potential to save lives as well as millions of taxpayer dollars at the same time.

By using geothermal/ground source heat pumps to circulate warm water through tubes buried in the concrete deck, the smart bridge eliminates the need for chemical or salt deicing during winter months. And the Mesonet — Oklahoma's statewide system of 114 weather monitoring stations which provide reports every 15 minutes — will signal the bridge's controls of approaching severe weather conditions. Instead of requiring concrete and rebar-deteriorating salt to thaw ice, the smart bridge prevents its deck from freezing.

With funding from the Oklahoma Turnpike Authority, professors from the schools of Mechanical and Aerospace Engineering, Biosystems and Agricultural Engineering, Civil and Environmental Engineering, the division of Engineering Technology and the Office of the Vice President for Research brought together applications long studied at OSU.

"This effort was led by Henry Bellmon, who as governor questioned why each year the Department of Transportation asked for millions of dollars to replace

bridge decks," says Jim Bose, professor and head of the Division of Engineering Technology and primary researcher. "He thought there had to be an answer to the recurring problem of deteriorating bridges due to road salt, and when he came to OSU, he started looking for it."

When OSU became involved in the installation of geothermal/ground source heat pumps with the formation of the International Ground Source Heat Pump Association, Bellmon wondered if the same technology could be applied to heating bridge decks, Bose says.

Ron Elliot, professor of biosystems and agricultural engineering, contributed research on the Mesonet system while Jeffrey Spitzer, associate professor of mechanical and aerospace engineering, constructed the first model of a bridge warmed by ground source heat pumps. Ed Knobbe, director

of the Environmental Institute and associate dean of the Graduate College, will lead the installation of a sensor system to monitor the life of the bridge.

"Oklahoma State University is proud to have played a role in developing safer, more user-friendly highways," OSU President James Halligan says. "The smart bridge concept is another example of the university at work in helping solve problems in the public interest."

Construction of the bridge is scheduled to begin in 1998 on the H.E. Bailey Turnpike near Chickasha. ▲

ADAM HUFFER

Much like its prototype in Texas (shown under construction here), the first bridge built in Oklahoma that will not require salt to prevent it from icing will utilize ground source heat pump technology. However, the designers of the Oklahoma bridge gave it "smarts," and it will use the Mesonet to predict inclement weather conditions.



© International Ground Source Heat Pump Association, 1997

# Noteworthy

## ACTON IGNITES SPARKS ASTOPELECTRICAL ENGINEER

**Scott T. Acton**, assistant professor of electrical and computer engineering, is the first Oklahoma faculty member to be named the Outstanding Young Electrical Engineer in the nation.



Scott T. Acton

The electrical engineering honor society Eta Kappa Nu presents the annual award to an electrical and computer engineering graduate younger than 35 and within 10 years of earning a bachelor's degree.

Acton, director of the Oklahoma Imaging Laboratory at OSU, was named the award recipient for 1996 for his work in image processing, which involves the manipulation and analysis of digital images. He has developed a target tracking technique for the Army Research Office and an approach to circuit board inspection for Lucent Technologies in Oklahoma City. He is also developing technology that will be used by NASA.

Acton, who has taught at OSU since 1994, received a bachelor's degree in electrical engineering in 1988 from Virginia Tech, where he was a Virginia Scholar and Marshall Hahn Engineering fellow. At the University of Texas where he earned a master's degree and Ph.D. in electrical engineering, Acton was a Microelectronics and Computer Development fellow and a Center for Space Research post-doctoral fellow.

## SNETHEN RECOGNIZED FOR 'CIVIL' INSTRUCTION

For exemplary performance as an instructor at OSU, **Don Snethen** has earned a national student honor society's top award.

Snethen, a professor in the School of Civil and Environmental Engineering, received Chi Epsilon's Excellence in Teaching award for 1995-96. In winning the award given annually by the scholastic honor society for civil engineering students, Snethen is the second consecutive OSU professor to receive the honor following Farrel Zwerneman, civil engineering professor.

It is the first time two professors from the same school have received the honor consecutively.

In addition to seven years of service as the student-elected adviser to OSU's Chi Epsilon chapter, Snethen developed and teaches the school's capstone senior design course. He has also developed new courses in geosynthesis, seepage, geotechnical investigations and soils in construction.

Snethen received the college's Halliburton Outstanding Faculty Member Award in 1994 and OSU's top honor for instruction, the Regents Distinguished Teaching Award, in 1993.

He is a fellow in the American Society of Civil Engineers and is a registered professional engineer in Oklahoma and Mississippi. ▲



Don Snethen



**Arena on Top of World** – OSU Assistant Professor Andy Arena, pictured above center with students, has received the 1997 Ralph R. Teetor Educational Award for his work as an aerospace engineering educator. He is one of only six professors worldwide selected this year by the Society of Automotive Engineers International to receive the award, given in recognition of curriculum development and improvement, academic service, publications, professional activities, teaching ability and research accomplishments. In addition to being ranked by students as one of CEAT's finest instructors, Arena has made contributions to college research such as the design of a research-grade wind tunnel that has the highest flow quality of any wind tunnel in this region of the United States. He joined the School of Mechanical and Aerospace Engineering in 1993. See related story, page 14. ▲

STORIES THIS PAGE BY ADAM HUFFER



# College Inducts Industry Leader, Inventor into CEAT Hall of Fame

The decision to study at OSU had a profound effect on **R. Gerald Bennett's** future. Here, the 1966 industrial engineering graduate developed the analytical and decision-making skills he would need to serve in leadership positions. Today, Bennett is the senior vice president of Equitable Resources Inc. in Houston, Texas, where he manages and directs oil and gas exploration and non-utility gas marketing.



*R. Gerald Bennett*

"I came from a small town in western Oklahoma and had absolutely no idea what the business world was like," he says. "Certainly the education I got at OSU was second to none. It prepared me to move into an industrial environment."

Bennett's understanding of the changing nature of management in American corporations and his interest in dispute resolution and goal setting have earned him the reputation of being an outstanding leader.

But Bennett's leadership endeavors reach beyond industry. He has been instrumental in a variety of community efforts such as the development of the Music Hall Theatre Foundation. He has also played a key role in the operations of Memorial Drive Presbyterian Church by serving in a number of capacities, including elder, for the past 20 years.

Bennett and his wife, Sandy, are the parents of two daughters, Shannon and Amber.

**Dr. Marvin M. Johnson** is a modern-day Thomas Edison.

The corporate technology research fellow with Phillips Petroleum Company holds 192 U.S. patents representing petroleum processing, chemicals, polymerization and other products and processes. He is a leader of the Technical Advocacy Committee, which encourages the proposal of higher-risk or longer-range research projects.

Johnson launched a brief second career in the 1980s as adjunct professor in OSU's School of Chemical Engineering.



*Marvin M. Johnson*

"OSU's chemical engineering department is first rate," he says. "Students' interests come first, and the curriculum is excellent."

Johnson received the National Medal of Technology in 1985 from President Ronald Reagan for the discovery and development of passive agents for catalytic cracking catalysts, a contribution that has elevated the nation's competitiveness in that technological arena. In 1994, he was elected to the National Academy of Engineering.

Johnson and his wife, Marilyn, have four children and 14 grandchildren. He is an elder in the Bartlesville Church of Jesus Christ of Latter-day Saints, former president of the Bartlesville American Legion baseball committee and a former coach for Little League and Pony League baseball. ▲

VONDA EVANS

# Lohmann Medal Awarded to Prolific Educator/Author

In 1968, Dr. J.N. Reddy was seeking a master's degree in mechanical engineering at OSU. Today, his impressive career includes the authoring of 10 popular textbooks and more than 200 technical papers for major international journals, as well as an extensive background in education, research and advising.

Because of his contributions, the College of Engineering, Architecture and Technology named Reddy the 1997 Melvin R. Lohmann Medal recipient.

Reddy's first home in the United States was at OSU, where he learned to operate an educational tool not available to him in his native India — the IBM 350 computer.

"It was exciting being introduced to a computational tool that is so powerful," Reddy says. "Computers became my primary interest."

The OSU alumnus went on to earn a Ph.D. in engineering mechanics at the University of Alabama at Huntsville in 1973. He held positions at several universities before being named the first recipient of the Oscar S. Wyatt Chair in Mechanical Engineering at Texas A&M University in 1992.

Reddy's textbooks include the internationally-recognized "An Introduction to the Finite Element Method." He has received numerous teaching and research awards and has been elected to the grade of fellow in six professional societies. ▲



*J.N. Reddy*

ADAM HUFFER

# Beyond the Lecture Hall

*What is* the ideal student experience? The concept is an abstraction that means something slightly different to everyone who has walked a university campus, and many of us use our own memories in an attempt to define it.



Ferguson

*But the College of Engineering, Architecture and Technology at Oklahoma State University believes an accurate definition of the student experience should include certain key ideas that take students beyond the traditional classroom lecture, giving them a broader view of the world around them.*



Hoines

*The CEAT has perfected the student experience by ensuring students have enrichment opportunities in which they develop leadership and teamwork skills, learn to communicate and socialize effectively, gain real world knowledge, acquire an appreciation of art and culture, visit national and international destinations, and much more. These opportunities enhance the education process and validate the college's curriculum, preparing students for life beyond graduation.*



Powell

*Five of the college's students and recent graduates can attest to the CEAT student experience. Their stories tell it all.*



Rachel

**A**t age 41, Clark Ferguson is finally on his way.



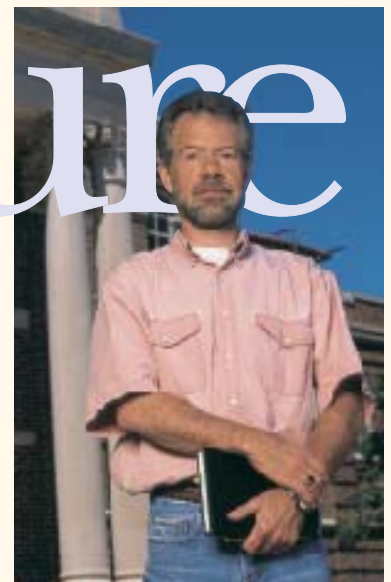
Paden

For the past five years, he has toiled in the degree program that many on this campus equate only with Veterinary Medicine in terms of the sacrifices it demands of students. He

has put in the time, earned Pella Jury Finalist honors in his fifth year and demonstrated the leadership and mentor skills necessary to serve as a teaching assistant and as a student representative on the search committee for the new head of the School of Architecture.

This summer, his educational program included a 60-day travel fellowship in Europe where he spent time in cities renowned for their beauty and age, including Rome, Athens, Paris and Venice. As the recipient of the 1997 Caudill Traveling Fellowship, he agreed to do so in exchange for most of the cost of the trip.

“The requirements are that you have 30 days after the day of graduation to leave the boundaries of North America for 60 days of architecture study,” Ferguson says. “Upon your return, you have to hand in copies of your sketches to the school.”



STORIES BY ADAM HUFFER AND LISA M. ZIRIAX



A jury of professional architects selects the recipient based on the student's portfolio. The fellowship is one of the school's top honors and an extension of efforts to encourage students to study abroad, says Randy Seitsinger, professor and head of the school.

"Travel is absolutely critical to the education of an architect," Seitsinger says. "Even in the Middle Ages, part of the education of a master builder was to travel and see architectural accomplishments."

Ferguson already possesses both the experience and talents to become a successful designer, and not simply because he excelled in one of the most decorated architecture programs in the country.

"I was a carpenter for 14 years before I came back to school, and before that, I was an art major at the University of Texas at Arlington," Ferguson says. "I felt like I needed to get on the other end of the business. The art, construction and architecture ... I feel like I have put it all together."

As a student, Ferguson had ample opportunities to put things together. He was a Pella Prize Competition finalist with his semester project of a futuristic, hypothetical headquarters here on campus for the OSU Foundation. In Ferguson's fourth-year design studio, he participated in the creation of the sprawling model of the Oklahoma City Metropolitan Area Projects, a detailed, life-like interpretation of the city's downtown once the revitalization has taken place.

"That was a great experience for us students and also for Oklahoma City," Ferguson says. "I think they were amazed at all the man-hours we put into the model."

This latest study of some of the world's oldest cities is Ferguson's third trip to Europe as an OSU architecture student. He first went as a participant in the school's European Summer program with Professor

David Hanser and then again the following summer for an independent study.

"Europe is a good place to study architectural history, and there is definitely plenty to sketch," Ferguson says. "I will be looking at how modern, public spaces are handled within a historic context."

Ferguson hopes to work for a firm in Connecticut that shares his interest in how older buildings relate to new architecture. The firm told Ferguson to contact them upon his return from Europe, he says.

**W**hile an OSU student, Todd Haines became accustomed to simple Midwestern living while experiencing the most excessive of recent American historical events. Were he a classical scribe, his time as transposed student of rural values, servant to the people, and witness to historic happenings could certainly serve as the basis of an epic poem. But he did not attend OSU to become a writer.

Haines came to the "West Point" of fire protection and safety technology from Wethersfield, Conn. After earning emergency medical technician status in high school and at 16 becoming one of the youngest people to receive fire fighter certification in the state of Connecticut, he joined the local fire department. There, he learned of a school almost 2,000 miles away that offered the world's only fully-accredited bachelor's degree program that combines fire protection and industrial safety.

"The application to OSU was the only one I filled out," Haines says. "It was the best school for fire protection, and I wanted the best if I was going to do this."

OSU not only offered Haines a first-rate education in fire protection and safety but also allowed him to maintain his ties to fire fighting. "Several students were asked to join the Ingalls Volunteer Fire Department, which turned out to be one of the best learning experiences for me," Haines says. "It helped me relate to different kinds of people and work with an organization that developed into one of the best volunteer fire departments in the state."

Haines also spent consecutive summers fulfilling internships with the Tempe Fire Department in Arizona. Working directly for the chief in the summer of 1995, Haines conducted a fire station relocation and response time study that the department uses today. The following summer, Haines contrib-

uted to a risk assessment of the city according to the International Association of Fire Chiefs Accreditation program. Tempe was the alpha site for the accreditation and this fall could become the first city in the world to receive it.

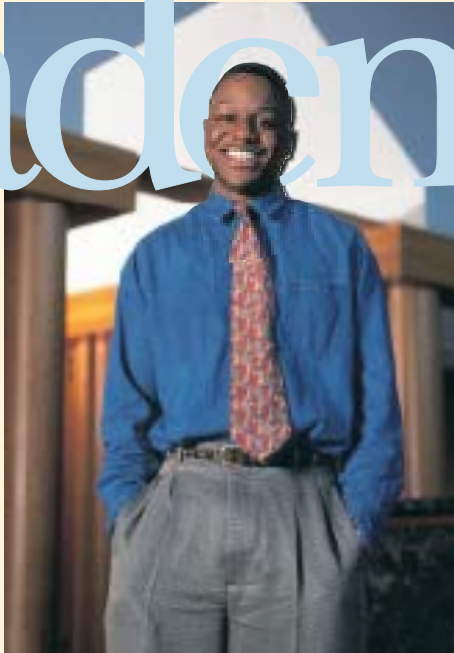
Haines also worked in Tempe briefly between the summer internships at the Super Bowl. As assistant to the Tempe fire chief, he served in the command center as a liaison between the local fire department and 30 organizations, including the ATF and the FBI.

Although he is reluctant to discuss it, Haines has seen the aftermath of disaster up close. His work as a research technician for Fire Protection Publications included driving associates to the airport, and he was on the road to Oklahoma City the morning of April 19, 1995. Haines arrived at the Murrah Federal Building moments after the blast and was put to work immediately in the triage center.

He accepted Congressional recognition from the State of Connecticut and a certificate of appreciation from the U.S. Department of Veterans Affairs, but he has shunned most accolades for his heroics, denying media interview requests and television appearance opportunities.

“I don’t really consider it heroic,” Haines says. “That’s what I’m trained to do, and that’s what I do. It’s part of the responsibility I took in deciding to become a fire fighter.”

Haines began working for Webb, Murray and Associates — a fire protection and safety contracting company in Houston — upon graduating with the largest fire protection and safety technology class in OSU history. He credits a solid OSU education for his employability, but his fondness for the university extends beyond programs and opportunities.



“The greatest thing I took from OSU was all of the friendships I made, and that just goes back to the quality of people there in Oklahoma,” he says.

**B**rian Powell might have been a college track star, but instead he chose to run a race that requires the same strength, determination and stamina, and much more.

Other schools offered track scholarships to the Lawton native, who was an all-state cross country runner in high school, but Powell decided he could secure a superior trophy by studying engineering at OSU.

“I decided to go the academic route ... with a little persuasion from my parents,” he says.

Now a senior chemical engineering student in the College of Engineering, Architecture and Technology, the 21-year-old is dashing through his final academic laps toward a rewarding finish line.

Forty-six percent of Powell’s freshman class in engineering had an ACT that placed them in the top 4 percent in the United States. With an ACT score of 30, Powell fell into the top 3 percent in the nation of all those who took the standardized test.

This distinction and his many other accomplishments led to consideration of Powell for special CEAT programs and scholarships. The Council of Partners awarded the high school valedictorian with a four-year scholarship of \$2,000 annually. He was also selected for the prestigious Scholars Enrichment Program, developed by the CEAT to recruit and retain exceptional students and to prepare them to take on future leadership roles in industry. Dr. Virgil Nichols, program sponsor, says Powell and the Scholars Enrichment Program are a perfect match.

“When Dean Karl Reid asks me to find someone to represent the Scholars Enrichment Program, the college and the university, Powell is one of the first persons who comes to mind,” Nichols says.

The summer after his sophomore year, Powell and the rest of the scholars group toured a variety of engineering facilities on the East Coast. But he says the pinnacle of the program came in May when the group traveled with Reid and Nichols across the globe to Japan.

Nichols says that because of Powell’s sharp communication skills and natural leadership abilities, he was often chosen to present gifts to OSU alumni living in

# Academics

Japan, as well as to Japanese CEOs and engineering managers after the group had toured their facilities.

“Just being able to stand up and talk to people in your own language is one thing, but to make a presentation to someone in another country and do a good job is another,” Nichols says.

Back in the classroom, Powell appreciates the fact that many of CEAT’s best faculty members teach in the undergraduate program. He also values the CEAT requirement that engineering students take a variety of engineering science courses.

“When you are out in the work force, you are going to be working with people from other areas of expertise,” he says. “You have to understand a bit of their background in order to communicate effectively.”

The CEAT offers pre-med programs in several areas of engineering. Powell, who is considering becoming a physician, is taking biology, physiology and other related courses to fulfill a pre-med option while also satisfying the requirements for an engineering degree. He is pursuing other paths, too. He just finished an internship with the Phillips Petroleum Company and twice has interned at General Motors in Oklahoma City.

Powell says he is searching for a career he can perform everyday and be satisfied. Because of his eagerness to seek out and utilize the resources provided to him through the CEAT, he is sure to find satisfaction.

**U**niversities often boast of their most talented students in order to attract other scholars. At OSU, 1997 civil and environmental engineering graduate Wendy Rachel was such a talent. In the words of her department head, for people like Rachel, second place is just never good enough.

Rachel made the most of the opportunities she found at OSU. In addition to an exemplary academic record that earned her OSU Top 10 Graduating Senior honors and the Dean’s Award as the Outstanding Student in Engineering in 1997, Rachel was one of the most active among a group of CEAT students who led initiatives to improve programs within the college and throughout the university. Because of her many activities and contributions, she was recognized by her peers as one of five 1997 St. Pat’s Salutes awardees.

Rachel, the 1997 president of the OSU chapter of the American Society of Civil Engineers (ASCE), helped the

concrete canoe team return to the national race and design competition this year after a disappointing loss at regionals last year. At the national competition, Team Double Jeopardy finished eighth out of more than 200 teams in the country who initially entered the contest.

“I have been involved with the concrete canoe program for four years, and I have seen my skills grow through it,” she says. “We were able to see some very positive effects of getting a large group of people interested in participating and realizing a common goal.”

Rachel also introduced a new ASCE program to bring recent graduates of the School of Civil and Environmental Engineering (CIVEN) back to campus to speak to students about hot concepts like teamwork.

“We wanted to tell the new students that in order to land the kind of job they want, it is as important to learn team-building and leadership skills as it is to get their engineering education,” Rachel says.

Robert Hughes, professor and head of CIVEN, and CEAT Dean Karl Reid asked Rachel to serve as the college representative on the University Student Honors Council. Here, she worked to encourage other CEAT students to enroll in honors courses, something once discouraged for students toiling in an already challenging curriculum. At the request of Reid, she also spoke to the department heads about the values of the Honors Program.

“One of the most difficult, high pressure speaking opportunities I had was trying to convince the department heads that their students should enroll in the honors program,” she says. “I believe the CEAT now has the second most students of all the OSU colleges active in the honors program.”

Hughes says the school benefits as much from the efforts of students like Rachel as the students benefit from the school.

“Having student leadership like she provided makes the department head’s job much simpler and easier,” Hughes says.

Koch Industries Inc. evidently recognized that quality in her. After completing an internship there in the summer of 1996, Rachel was offered a signing bonus to come back as a full-



time employee upon graduating. She joined Koch in July as an engineer in the company's Environmental Excellence division where she works in the assessment of environmental risk, helping to preserve the natural landscape she came to appreciate growing up in Edmond. Her immediate plans include obtaining her professional engineers license and then learning as much about the business side of Koch's operations as possible.

When she does, don't be surprised if in the near future, Wendy is running a company of her own.

**M**ark Paden insists you don't become a leader simply by writing the word "president" next to your name.

"You have to be able to enhance an organization, to make it better. I think that speaks well of a leader," says the 1997 OSU chemical engineering graduate.

Paden put his personal philosophy to the test during his five years at OSU, achieving a remarkable account of campus involvement. Now an associate research chemist and project engineer with Kerr McGee Corporation in Oklahoma City, Paden was only moderately active at his Ponca City high school, but his approach to student life changed when he entered OSU in 1992.

"It's kind of like you start with a clean slate. You can pretty much become a new person," says the 23-year-old. "I really became more active on campus, more social."

As a freshman, Paden joined Delta Tau Delta fraternity where he began networking with other students. During his junior and senior years, he served on the Student Government Association, the College of Engineering, Architecture and Technology Student Council,

the Student Alumni Board, the Interfraternity Council and Blue Key honor society. He also tutored students in math and science, played several OSU intramural sports and was a homecoming king finalist.

Through service on the Student Alumni Board, Paden participated in high school recruitment activities and interacted with distinguished OSU alumni like Bud Seretean. But his real chance to shine as a

leader came when he served as president of the Interfraternity Council, which governs campus fraternities. Darin Behara, coordinator of Greek Life and adviser to the Interfraternity Council, says Paden's leadership skills were put to the test when he led the Council effort to adopt a substance-free housing policy in the fall of 1996.

Behara says many OSU officials were confused as to why such a policy was needed when alcohol and drugs were already forbidden in fraternity and sorority houses. But Paden insisted on moving forward with the measure, which was ultimately passed by the Council and currently awaits full endorsement by the OSU administration.

"Mark basically stood on the principle that we as a system need to take the leadership of holding ourselves accountable to university policies. He held that the implementation of such a policy would strengthen the Greek system," Behara says.

Paden often squeezed more than 20 hours of meetings into a weekly schedule already filled with classes and homework, but he still managed to earn an impressive 3.89 grade point average and complete an internship at a Koch Industries refinery.

Because of his well-rounded record, he was named one of OSU's top five graduating males, and his peers also noted his unusual accomplishments by naming him one of the top five graduates in the CEAT. Dean Karl Reid recognized Paden's achievements at OSU and selected him to represent the college's graduating students by carrying the orange and black gonfalon during May graduation ceremonies.

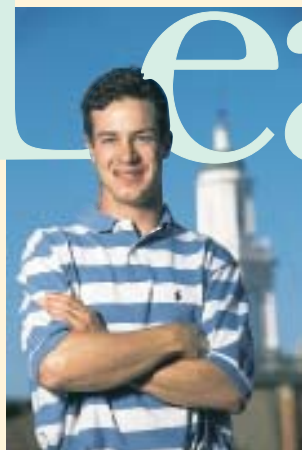
Paden says that while his academic endeavors have given him the technical knowledge needed to succeed in the work world, he learned through his role as a campus leader how to communicate with people from different backgrounds — a skill valued by employers.

"A 4.0 (grade point average) looks great, but you've got to be able to communicate your ideas and to work with a variety of people," he says.

Paden plans to serve in future leadership roles where he can utilize all of the skills he acquired at OSU.

"Maybe I'll be plant manager someday," he laughs.

Maybe CEO. ▲



Architecture Students 'Remodel' OKC, Tulsa in ...

# A Tale of Two Cities

Urban developers in Oklahoma's two largest cities consider OSU architecture students model citizens.



Andrea Werner adds a creative touch to the multi-sport, outdoor arena for the Tulsa Project.

Instead of hiring a private firm to do the job, Oklahoma City and Tulsa significantly saved money by employing students from the internationally-recognized School of Architecture to complete projects dealing with the redesign of portions of their downtown areas.

A massive model of Oklahoma City's Metropolitan

Area Projects (MAPS) was constructed in 1995 by fourth-year OSU architecture students. The display featured representations of the approved seven MAPS projects along with the young architects' rendering of downtown Oklahoma City after initial development.

Not to be outdone, the 1996 class completed the Tulsa Project. This design exploration incorporates actual projects funded by Tulsa's third penny sales tax extension and the Blue Ribbon Task Force on Downtown. The project includes two scale models and

drawings illustrating amateur sports facilities for baseball, track and field, soccer, swimming and gymnastics as well as a new arena for basketball and hockey. Also featured are representations of expansions and/or renovations for housing, city streets, the convention center, the Main Street mall and the performing arts center.

"Our students followed the recommendations of the task force on the downtown sports and convention facilities, but their design study also resulted in a totally new look at traffic circulation, housing and a pedestrian mall within downtown Tulsa," says Bob Heatly, associate professor of architecture.

Tulsa leaders hope the renovations will make Tulsa a place that both spectators and athletes enjoy, says architecture Professor David Hanser.

At just under an estimated 25,000 hours, the project would have cost Tulsa an astronomical amount of money if it had employed architects who have already graduated from school, says Steve Childers, vice president of Downtown Tulsa Unlimited Inc., the project sponsor.

"This relationship was beneficial for both the City of Tulsa and OSU," Childers says. "We have the only

current scale models of downtown Tulsa in 15 years, and the students had the opportunity to work on a project of this magnitude."

The Tulsa Project is on display in Tulsa at the Downtown Tulsa Unlimited headquarters, 320 S. Boston. ▲

ADAM HUFFER



Russell McDaris (right) and Ko Makabe tower above the simulated Tulsa skyline. The model required more than 10,000 hours to assemble and was completed in four individual sections for easier transportation to Tulsa.

# focusOnDesign



## Capstone Course Seniors Get Dose of Real World

**F**or five years, a unique program sponsored by the Hoechst Celanese Corporation has helped chemical engineering seniors enrolled in the final capstone design course make the important transition from student to engineer.

Until Hoechst Celanese began supplying the students with actual industrial problems taken from operations at the company's chemical plants, engineering professors would provide the problem statement themselves, says Dr. Rob Whiteley, co-instructor for the course. But that wasn't the same.

"The students are convinced if professors give them a problem that we just made it up. They know it's real when Hoechst Celanese provides the problem," he says.

Jim Curtis, who earned a master's degree in chemical engineering from OSU and is now a process engineering associate with Hoechst Celanese, writes a problem statement for the students to solve. Students are divided into teams in which they work to devise solutions to the problem. In April, they present their solutions to a Hoechst Celanese "business team," which distributes monetary awards to the teams with the top three solutions.

Jessica Lu, a chemical engineering senior whose team won the first place award this year, says making a presentation to corporate representatives was the most challenging aspect of the project — and the most rewarding.

"It motivated us because we knew this was a real problem," she says.

Whiteley says the course helps students transition from the classroom to the workplace by giving them confidence in their ability to apply what they've learned in college to real life situations, putting them one step ahead of students from other schools.

"The truth is, when you leave this class, you're no longer a student, you're an engineer," he says. ▲

## Teamwork Soars in Aerospace Class

**N**o one flies solo in Dr. Andy Arena's aerospace engineering senior design class.

The assistant professor in the School of Mechanical and Aerospace Engineering ensures his students are prepared for their futures by emphasizing teamwork, a concept often lost in academia's textbook world where students usually work alone.

At the beginning of the semester, Arena divides his class into two teams and assigns a challenging aerospace project to be completed by semester's end. The teams are comprised of students from various academic disciplines who have the skills and knowledge needed to complete the project.

"This approach helps students learn to draw on the strengths of others as well as get a glimpse of how an industrial environment functions," Arena says.

Last semester, Arena assigned students to build a solar-powered airplane, a multidisciplinary project requiring the skills of aerospace, mechanical and electrical engineering students. Both teams completed the task.

Valerie Gordon, chief engineer for one of the teams, says although the project intimidated students in the beginning, the idea of building an operational airplane pointed team members toward a common goal.

"It was nice to see how everything is interlaced and how you have to work together in industry," says Gordon, who graduated from OSU in May and is now employed by the Houston engineering firm M.W. Kellogg.

Arena's students often gain more than just a valuable educational lesson. Participation in the class sometimes leads to job offers.

"Our response from industry is always very positive," Arena says. "I've talked to organizations like NASA, and they like the approach of people from different disciplines working together." ▲

STORIES THIS PAGE BY LISA M. ZIRIAX



# Studentdigest

## SHPE Creations Achieve Trip to Competition

After placing third last year, students in the OSU chapter of the Society of Hispanic Professional Engineers (SHPE) returned this year to the SHPE national design competition.

At the National Technical and Career Conference in Philadelphia, seven OSU chapter members presented original designs of their Audio Interactive Voice Response (AIM) system and a device called the Lifeguard that can help prevent the drowning death of a child.

Designed to assist the blind, AIM utilizes the Interactive Voice Response (IVR) network. Much like any caller who uses touch-tone signals to get information about their bank account, a user can call a 1-800 number, submit his room number, and get information and directions within the Philadelphia Marriot, says Matt Cuellar, a senior in the School of Mechanical and Aerospace Engineering and design team captain.

The Lifeguard is an infrared motion detector for installation around the perimeter of a swimming pool. It triggers an alarm within the house if breached, says Juan Gomez, an electrical and computer engineering senior.

The national SHPE organization selects only the top 10 designs in the country for the finals. ▲

## Canoe Team Sinks Regional Rivals

Students in OSU's American Society of Civil Engineers proved you can't keep a good team down. The group returned to national prominence this year by winning the 1997 Mid-Continent Conference Concrete Canoe Competition that includes civil engineering schools from Kansas, Illinois, Arkansas, Missouri and Oklahoma.

At the regional, Team Double Jeopardy placed first in every event except one. As champions of the region, they represented their peers at the 10th anniversary of the national competition in June in Cleveland, Ohio.

"Prior to last year, the students won three regional contests in a row," says Robert Hughes, professor and head of the School of Civil and Environmental Engineering. "The students have long been so advanced in their design, OU students asked our students to give them a seminar last year in Norman."

With a major contribution from Conoco and substantial grants from Lowe's, Buildex and The Paint Place, the team constructed its most impressive entry yet, says Tom Graham, canoe team chair.

"We wanted it to remind the other schools of OSU's double threat of a fast, race-winning canoe and a superior academic performance," Graham says.

More than just trophies and recognition, the concrete canoe competition gives students a time to shine, CEAT Dean Karl Reid says.

"The project is a marvelous example of engineering, teamwork, leadership and communication," he says.

Team Double Jeopardy finished in eighth place out of 25 teams at the national competition. More than 240 schools participated in the ASCE Concrete Canoe contest this year. ▲



Annie Forsberg (front) and Jenny Wright power Team Double Jeopardy's practice craft through the waves in preparation for the national competition.

STORIES THIS PAGE BY ADAM HUFFER

# Asian Adventure: Students Bask in the Land of the Rising Sun

**O**SU engineering students got a taste of the East when they embarked with two sponsors on a two-week excursion through some of the world's most progressive firms.

For its participants, this technological pilgrimage to Japan was an important lesson in how to optimally provide engineering solutions for the human race ... and hospitality.

The Scholars Enrichment Program aspires to help top engineering students become business and community leaders by providing a variety of experiences intended to promote academic excellence and personal development. Although the May 1997 trip to Japan is only a small part of the program, it could certainly be considered the highlight.

During visits to corporations like Takenaka, Yamatake-Honeywell, Sony, Toyota and Matsushita, 16 students got a firsthand glimpse of product development for the next century. High-definition television, 500-kmph electromagnetic trains and earthquake-resistant buildings are no longer just concepts, says Karl Reid, dean of the College of Engineering, Architecture and Technology and tour sponsor.

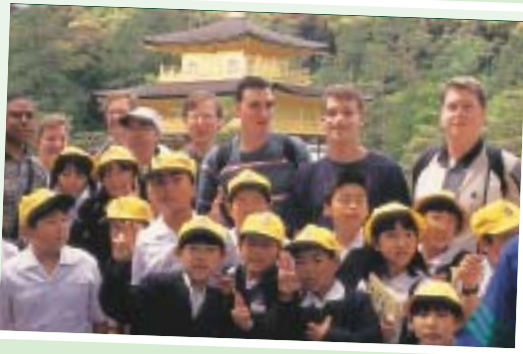
"We strive to give our students a perspective on current engineering practice and emerging technologies during the international trip, and this year was one of our best," Reid says. "These students got to see products that won't be available in the United States for several years."

The sojourn was not all business, however, because a global education has to include cultural experience. The students took a sobering trip to the Peace Park in Hiroshima, and as the guests of the OSU Alumni of Japan and executives from several corporations, the group received five-star treatment at some of Japan's finest establishments. Following a tour of a modern manufacturing plant and a discussion about engineering in Japan with a group of managers, Yamatake-Honeywell hosted the group for an elegant luncheon at the exclusive Tokyo American Club.

The highlight of the accommodations came in historic Kyoto where the group stayed in a private ryokan, or Japanese inn. Sleeping four to a room on futons laid on tatami mats and sharing one shower each for the men and women provided an interesting experience.

"I have never seen a more marvelous display of hospitality and grace," says Virgil Nichols, director of CEAT Student Academic Services and tour sponsor. "From top level management at Sony to the hundreds of kids we saw on school tours to the engineers and professors who took us on fabulous tours, everyone showed a genuine interest in talking to our students. They treated us like royalty." ▲

ADAM HUFFER



Schoolchildren in Japan frequently take weekend trips to places they study in class, and we saw a lot of them at the Golden Pavilion, a site much like a national park here. They acted excited to meet us, and they all wanted to get their pictures taken with us. Finally, a guard had to push us away because we were crowding up the area.

— Tom Hall, mechanical and aerospace engineering/pre-med senior



We had a chance to learn about cutting-edge technologies under development at Japanese firms. Many of them, like the products at Sony's Nobutoshi Kihara research facility, will not be available in this country for several years. Here, Dean Karl Reid took the opportunity to meet several old friends of his grandchildren.



A group of young engineers and executives from Yamatake-Honeywell hosted us at the Tokyo American Club for a discussion on the differences between Japanese and American culture. The food was as exquisite as the environment we were staying in. The meal was our first encounter with sushi ... We flocked to the Hawaiian chicken. — Steven Baranski, civil and environmental engineering senior

photos/courtesy Tom Hall

# Graduates 'Step Up' Through OSU-Conoco Partnership

For decades, OSU's partnership with Conoco has moved many dreams to reality for OSU engineering graduates. In fact, Conoco hires more graduates from OSU than any other college or university.

One of the more striking examples of the results of this partnership is Ted Davis, who graduated from OSU in 1962. Davis, vice president of Upstream — North America for Conoco Inc., came to OSU on a basketball scholarship and later played varsity football. That is when he began to discover what made OSU stand apart from the standard big school.

The style of OSU industrial engineering professors Wilson Bentley and Earl Ferguson not only encouraged Davis to pursue a master's degree after he finished his bachelor's, but also influenced elements of his future management attitude, which can be explained in three steps: look closely at an individual's personality, bring out the best in him or her, and find the right career match.

And the right match for Davis was Conoco. He has held positions in petroleum exploration and production, natural gas operations, pipelines, gas processing, commercial and regulatory activities, and liquefied petroleum gas operations and marketing. Throughout his career path at Conoco, Davis has remembered OSU — and its focus on its people.

"OSU engineering students are willing to work hard in their chosen field, but not to the exclusion of being well-rounded individuals," Davis says. "They get things done, and they still have time for life. I like that. That's the kind of person I want working for me."

Some 30 years after Davis' OSU experience, Kari Gutierrez fit the philosophy subscribed to by Davis — and OSU. After graduating with an engineering degree in May 1997, she traded a cap and gown for a lab coat with the Conoco emblem on it. She is a process engineer assigned to the Venezuelan Extra Heavy Oil Project where refineries are designed to "lighten up" Venezuelan crude for U.S. refineries.

"I always liked math and science in high school, which led me to think about a career in engineering," Gutierrez says. "OSU's engineering program has a reputation for being outstanding academically. The faculty works closely with the students to bring out their best talents, and the interaction between the college and Conoco opened the door for my career." ▲

BARBARA SWIGGART



photo/Anthony Harr

## Corporate Donations Boost CEAT Programs, Resources

Phillips Petroleum Company's historic gift of \$1 million will support infrastructure development and student enrichment programs such as the Phillips Engineering Scholars program.

Many donations to CEAT during the past year have focused on the new Advanced Technology Research Center (ATRC), such as Kerr-McGee's gift of \$500,000 which will furnish and equip a lecture hall with distance education and multi-media features. The ATRC polymer research labs will wear the name Halliburton due to the company's \$325,000 investment. OG&E Electric Services has provided a \$250,000 gift for energy conversion and storage laboratories, and Conoco's gift of \$250,000 will equip two ATRC laboratories for research on converting natural gas and coal to electricity.

The Williams Companies, the Public Service Company of Oklahoma, Ed and Mary Malzahn and C.S. Cho each have provided gifts of \$100,000 or more which will be used in the ATRC. Also, The Bartlett Foundation has established an endowment for a chair in chemical engineering. Russell Rhinehart, former professor at Texas Tech and new head of the OSU School of Chemical Engineering, will be the first holder of the chair. The Noble Foundation's \$2 million challenge grant will provide state-of-the-art scientific equipment for the ATRC. ▲

For more information about "Bringing Dreams to Life: The Campaign for OSU," contact Marc Thompson, CEAT development director, at (405) 744-5142, or by e-mail at [thompsm@okway.okstate.edu](mailto:thompsm@okway.okstate.edu).



Kari Gutierrez (left) and Ted Davis have benefitted from the strong OSU-Conoco partnership that has blossomed over more than three decades.

# Why are Benjamin and Erica smiling?



*Under His Wing* – Wayne Allen, chief executive officer and chairman of Phillips Petroleum Company, welcomes engineering freshmen Benjamin Flint, Bartlesville, and Erica Snider, Hominy, into the recently-established Phillips Engineering Scholars program.

## Phillips Petroleum is paving the road to their futures.

*“The future is an ever changing place, and it takes a special type of person to be ready for all of the unforeseen challenges that come along. Phillips is proud to be able to provide resources to help equip some of our young people with the tools they will need to succeed in the industrial world of tomorrow.”*

– Wayne Allen, chief executive officer and chairman of Phillips

**The Phillips Engineering Scholars program will help recruit and retain talented students who might not otherwise attend college in Oklahoma.**

These OSU engineering freshmen will tell you that the company’s generous annual gift of \$200,000 to the College of Engineering, Architecture and Technology is helping fund the unprecedented Phillips Engineering Scholars program. As part of the first class of scholars, Benjamin and Erica receive ...

- **Professional development – including access to a professional engineer at Phillips as a mentor**
- **Full payment of tuition and on-campus room and board**
- **Travel to national and international destinations**
- **Leadership and teamwork development**
- **Career awareness and self-assessment activities**
- **Community building and cultural activities**
- **Academic advancement**