

THE
CHANGING

OF ENGINEERING, ARCHITECTURE & TECHNOLOGY

2000 OKLAHOMA STATE UNIVERSITY

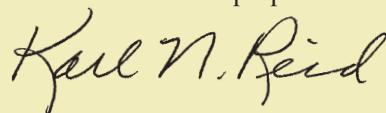
FROM THE DEAN

This issue of IMPACT focuses on the *changing face* of the only College of Engineering, Architecture and Technology in the nation. Marvelous human interest stories will give you a glimpse into the impact the college has had on some of our youngest graduates, the contributions made by three of our most distinguished graduates to their professions and communities, and the enormous impact on the CEAT and on the lives of hundreds of young people made by seven of our faculty who have recently “hung up their saddles.”

The changing face of the CEAT the last few years has been dramatic, and is underscored with examples in this issue of IMPACT — the clean room in the new Advanced Technology Research Center that provides a “teaching-hospital-like learning environment;” the extension of the classroom to “any-place, anytime” through the use of technology; the way students learn the essence of engineering, architecture and technology through experiences inside and outside the classroom; the incredible success of our students in international competition; and the unusual career paths taken by a few of our recent graduates.

What we do in the research laboratory today, and where the research and technology transfer is done, dramatically differs from 10 or even 5 years ago. This issue of IMPACT features – “grass-to-gas” or biomass to ethanol conversion; the combination of optical and electronic techniques to transmit information at terabit rates, 200 times faster than today’s best performing fiber optics; a unique partnership involving four universities and the EPA which is addressing environmental problems resulting from oil and gas production and processing; a high impact program for delivering technology to small and rural manufacturers in the state; and the application of ground source heat pumps to heating and cooling Stan Clark’s new, innovative restaurant, Joseppi’s.

Early this year, the National Academy of Engineering selected the top engineering achievements of the past 100 years based on the criteria of greatest impact on our quality of life. Although it is impossible to predict what technological changes the next hundred years will bring, it is clear that OSU engineering, architecture and technology graduates will be among the pilots of change! And, the CEAT will need to have a continually changing face in order to prepare them for the challenge.



Karl Reid, Dean
College of Engineering, Architecture and Technology

photo/Adam Huffer



First-year CEAT students Angela Wheeler, Devona Williams and Cody Braswell were named the 1999 recipients of the Wal-Mart Competitive Edge Scholarship, a merit prize based on academic achievement, ACT score and prospective field of study. The Wal-Mart Foundation annually presents the four-year, \$20,000 award to as many as three freshman students at OSU. Last fall, all three winners at OSU were female engineering scholars.

I M P A C T

VOLUME 7, 2000

the changing face of **TRANSITIONS** ENGINEERING, ARCHITECTURE & TECHNOLOGY

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Unlike those whose livelihood is defined by the changing times, Engineers, Architects and Technologists shape the future of the world. Diversification in curriculum, delivery of programs, facilities and, above all, people, has enhanced the CEAT's ability to fulfill its mission of research and extension as well as preparation of graduates for careers that affect the global community. Acknowledging traditions of the past, CEAT faculty and staff, students and alumni are building a better tomorrow for all people. From clean rooms and operating rooms to board rooms and class rooms, their IMPACT is immeasurable.

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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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I M P A C T

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ON THE COVER: The image of R.E. Chandler's 1911 mechanical engineering class in Old Central that appeared in the Engineering, Architecture and Technology edition of OSU's *Centennial History Series* provides a stark contrast to the teaching studio adjacent to the ATRC clean room. See the related story on page 6.

Cover design by Valerie Kisling

VIP INVITATION

The CEAT wants you to have access to up-to-date information on everything from the continuing development of the Advanced Technology Research Center to the establishment of new academic programs on the Stillwater campus and in Tulsa.

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@okstate.edu. If a trip to campus is not possible, visit the CEAT homepage through the OSU Website at www.okstate.edu.

THE CHANGING *face*

Any Time, Any Place



The College of Engineering, Architecture and Technology is making it easy for working professionals anywhere in the world to further their education through distance learning.

The concept is nothing new to CEAT.

"The college was an early adopter of distance education strategies," says CEAT Dean Karl Reid. "We have been participating in the National Technological University (NTU) since 1985."

Reid serves as chairman of the NTU Board of Trustees. The university is a not-for-profit fully accredited university that is the primary provider of programs to address the advanced technological education of working managers and professionals.

NTU currently offers master's degrees in 14 engineering, technical and management disciplines. Courses are delivered via leading-edge telecommunications technologies from a working alliance of 52 universities that include OSU, MIT, SMU and the University of Illinois. Classes are provided via Internet, satellite and videotape.

"Students take classes from the best professors at the best universities in the country," says Reid, "but their degree is actually from NTU."

NTU also offers master's degrees entirely online. Students can earn master's degrees in computer science, computer engineering, software engineering or systems engineering by simply logging onto the Internet.

OSU currently has four faculty members who teach courses offered by NTU: George Scheets, Ken Case, David Mandeville and John Nazemetz, who teaches an online course via the Web in computer aided manufacturing.

Reid is proud of CEAT's involvement in NTU and other forms of distance education.

"This is a message here for our alumni," says Reid. "When graduates leave OSU, we have a responsibility to help them enhance their portfolio and competitiveness no matter where they go.

"We want to be a provider to them as they continue throughout their career, and distance education and the Internet allows us to do that."

Tulsa Time

The College of Engineering, Architecture and Technology (CEAT) continues its commitment to substantially increase opportunities for engineers and technical managers in the Tulsa area who want to further their education through both credit classes and non-credit continuing education short courses and workshops.

The college has recently increased its number of full-time faculty at OSU-Tulsa. Joining Stephen Bell, professor of electrical engineering, and George Scheets, associate professor of computer and electrical engineering, are Louis Johnson, associate professor of computer and electrical engineering, and Will Clarkson, associate professor of civil and environmental engineering. Paul Rossler, formerly of Kettering University, has joined the OSU-Tulsa faculty as coordinator of the master's degree in engineering and technology management (MSETM) in the Tulsa area.

"We started a bachelor's degree in electrical engineering and expanded our labs last year," says CEAT Dean Karl Reid. "This is in addition to the mechanical engineering and computer engineering degree programs we launched in Tulsa this fall."

Reid says the additional programs will help Oklahoma meet the high demand for engineers. "Tulsa gives us an additional opportunity to attract students and fill engineering needs in Oklahoma, especially in the areas of telecommunications and aerospace."

OF *curriculum* distance learning

CEAT Dean Karl Reid, Kerr-McGee CEO and Chairman Luke Corbett and his predecessor Frank McPherson, OSU President James Halligan and OSU Executive Vice President Marvin Keener cut the ceremonial ribbon at the dedication this spring of the Kerr-McGee Seminar Room. The 85-seat, all-purpose facility in the Advanced Technology Research Center features distance learning and full multimedia-conferencing capabilities.



MSETM Program Delivers

Kimberly Richards' plan when she joined Whirlpool's Ft. Smith division in 1988 was to move up the company ladder. OSU has been a part of her ascension almost every step of the way. The latest innovative graduate degree introduced by the CEAT for career-minded professionals has empowered Richards to make the climb. Her completion of a master of science degree in engineering and technology management (MSETM) just 21 months after the inauguration of the program is testament to her diligence.

This May, Richards was among the first six graduates from the MSETM program. She credits her astounding finish to the relevance of courses to her position as a senior product engineer, as well as the convenience of taking them via videotape and the Internet.

"I believe they envisioned the program requiring three to five years for full-time employees, but when I started, I decided to be really aggressive," Richards says. "My goal was to finish while I was still 30, and I made it by two months."

Richards had plenty of experience going to school while working. She earned her bachelor's in mechanical engineering in 1994 while on successive educational leaves from her then position in Whirlpool's quality engineering department. And while at OSU, she became the first female employee at the MAE Laboratory.

"I would come back here and work May through August, then go back to Stillwater on educational leave and work

part time at the MAE Lab while going to school full time," she says. "In graduate school, I could use examples directly from my job for project activity in classes."

She selected the MSETM program over an MBA or mechanical engineering graduate degree primarily because of its applicability to her job.

"I took some classes in another engineering graduate program that I couldn't relate to the manufacturing we do here," Richards says. "It was not helping me improve my job performance at Whirlpool."

"With the MSETM program, I found a selection of courses like Dr. Case's industrial statistical process control and design of experiments class, which involved strategy and problem solving, that provided immediate impact in the workplace," she says. "They were useful in my tasks to drive quality improvement and cost reduction projects in a manufacturing plant, and many other courses prepared me for all aspects of decision making."

Richards admits that the degree does not automatically translate into a promotion, but you can bet another one is in the works for the engineer who began her employment with Whirlpool on the assembly line.

"The program has a focus on the future and teaches you what you need to do to succeed in changing times," Richards says. "This degree has provided me with a broader perspective of not only my business, but business in general."

Internet Engineering

Oregon resident Aaron Conger couldn't make it to the Oklahoma State University campus to further his engineering education. So, OSU is bringing the campus to him via distance learning.

Last fall, Conger and 14 other students from across the globe, began taking classes toward a master's degree in control systems engineering (MSCSE). His classmates include engineering professionals from as far away as Singapore and Canada.

The program is a collaboration between the Schools of Mechanical and Aerospace Engineering, Electrical and Computer Engineering, Industrial Engineering and Management, Chemical Engineering and Biosystems and Agricultural Engineering.

Conger, who works as a process engineer at Ash Grove Cement Company in Durkee, Oregon, receives instruction through videotape. He accesses coursework, classnotes, tests and projects via the Internet.

"I'm interested in quality assurance," says Conger. "Everyone agrees we need to maintain quality, which is why I'm taking classes to learn how to achieve it."

Conger says he's learning exactly what he needs to know to become a better process engineer. "Every class I've taken seems to relate to control engineering – how to actually control a process," says Conger. "In the cement industry we have a large amount of dead time, (the time it takes for a change you've initiated to take place) so it's difficult to control without some theoretical knowledge."

Conger says his company has been extremely supportive of his educational endeavor. "They realize the benefits of what I'm trying to do."

MSHCA Nurses Dreams

Niki Moman and Pam Sewell are lifelong friends with a lot in common.

Both are registered nurses. Both work as health care administrators. And both are pursuing their dream of a master's degree in health care administration (MSHCA) at Oklahoma State University.

Michael Branson, professor of industrial engineering, coordinates the program, and faculty from five OSU colleges participate. The program features a curriculum related to the management of health care organizations and is designed to meet the needs of people with clinical or other health-related degrees who hold or will hold administrative/managerial positions in health care settings.

Moman is director of surgical services at Midwest Regional Medical Center. Sewell is director of the Midwest Renaissance Women's Center. The women have been attending classes via distance education for the past two years.

"It's great because we're able to take the classes in the evening, and we don't have to travel a long distance," says Moman.

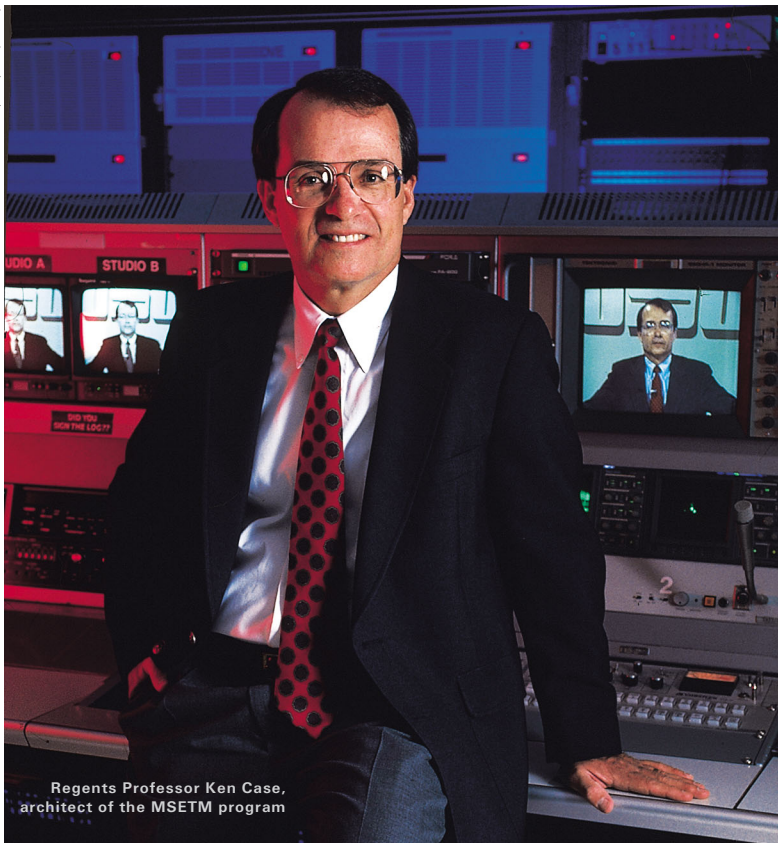
Sewell also likes the program's flexibility. "It's not strictly a human resources degree program," says Sewell. "I'm able to mix and match MBA courses with human resources courses."

Moman agrees. "The classes cover things I deal with on a daily basis like hiring, termination and budgeting. It's strengthened my knowledge base and also helped me pick up new information that I can apply daily."

Moman and Sewell take courses via live, compressed video at centrally located sites in Oklahoma City, and if one of them misses a class, they can make it up by simply checking out a videotape of the satellite broadcast.

"The program is more accessible to people who work a full-time job," says Moman, "and it's great for adult learners who lead a busy life."

photo/Andy Maxey



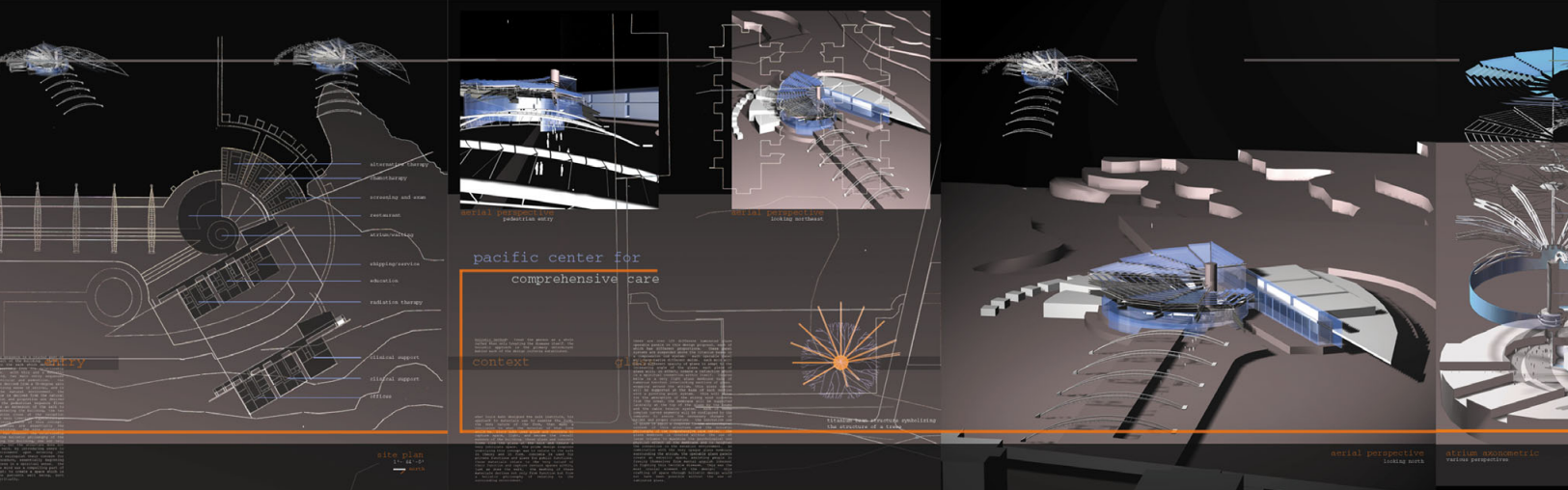
Regents Professor Ken Case, architect of the MSETM program

A Pinnacle of Design

Nothing inspires American achievement quite like international rivalry. U.S. astronauts landed on the moon in a fierce race with the Russians. Joe Louis' rise to the top of boxing began after his loss to Max Schmeling. And the quality of domestic automobiles and motorcycles before Toyota, Datsun and Honda imports doesn't get mentioned much in Buchananite reflections on "the good old days."



photo/Adam Huffer; graphic/School of Architecture



OSU's School of Architecture, in winning and/or placing in more international and national design competitions in recent years than any other institution, already sits near the pinnacle of architecture programs. Its students need not look outside tradition or their classes for motivation in professionally judged, inter-university contests. However, fourth-year seniors entering the DuPont Benedictus International Student Design Competition this spring wanted to make triumphant OSU's return following a four-year absence.

They went in fully aware of their primary competition. "We knew University of Hong Kong students had swept it for the past few years," Corey Graham says. "They spend an entire semester on their entries, working as teams, and we wanted to make a statement with our six-week, individual projects."

In the competition featuring more than 700 students from 83 schools of architecture around the globe, Robbie Forslund, Scott Sondrup and Graham made a huge statement. Dethroning the University of Hong Kong, Forslund took first and \$5,000 while Sondrup and Graham each received \$1,250 for honorable mentions.

"We've had other students on occasion win the Paris Prize or the Van Allen, but those contests have been discontinued," says John Bryant, co-instructor of the fourth-year studio. "Right now, the DuPont competition is probably the most prestigious international competition; it's the Olympics."

"For us to take three of the five awards from the University of Hong Kong, the perennial winner that has swept it for the last few years is incredible," Bryant says.

The contest centered on the Pacific Center for Comprehensive Care, a proposed cancer treatment and preventive studies retreat near Torre Pines, California. The project was the first instance an entire studio class used computer graphics for their individual works, according to co-instructor Mohammed Bilbeisi.

"Part of the challenge was to illustrate innovative uses of laminated glass, a popular fixture today in architecture," Bilbeisi says. "This was the most extensive, complex use of computer graphics by almost every student in the class, but their ideas about architecture won it for them, not how they were drawn."

The students attributed their success to a number of factors.

"The school is evolving and is gradually encouraging the use of computer graphics," Graham says. "Using the computer in this class was optional, but everyone was interested, and once the class decided we were going to use it, it became a way to challenge each other."

Program Gets Its Wings

Fresh off the second consecutive, second-place finish by its students in the most comprehensive, international design/fly/build competition, the state's oldest and largest aerospace engineering program has been officially given its wings.

Some 40 years after OSU's aerospace program received national accreditation, the Oklahoma State Regents for Higher Education this summer approved a bachelor's degree in aerospace engineering. The endorsement, which actually amends an archaic, ambiguous title, occurs when the aerospace industry has swelled to rank as the state's third largest in terms of revenue and employment.

The board action ordains what OSU has offered since 1960; an aerospace degree program that, although housed within the mechanical engineering department, is accredited fully as an independent curriculum. Previous qualification of aerospace as an engineering option diminished its valuation, says Associate Professor Andy Arena.

The action is particularly timely as OSU reasserts its lead as the premier aerospace engineering school in the region. OSU's aerospace program is the only curriculum in the country that offers a flight testing component, and its capstone senior design course is also a unique innovation. The ultimate goal of the class is to build a scale-sized plane for entry in the American Institute of Aeronautics and Astronautics' international competition, in which OSU teams captured second and fifth places out of 30 entries this year.

Arena says board approval of the degree helps an aerospace program that has experienced 150 percent growth over last year and that sits in the center of the country's fastest-growing sector of the aerospace industry.

"A lot of people don't realize how important the aerospace industry is to Oklahoma, where one out of every 13 workers owes his or her job to aviation and aerospace, and the industry accounts for \$4.7 billion in payroll."



photo/ops.usone.iu.edu/~amhbf/

The entry by electrical and computer engineering seniors (from left) Joe Dowlen, Sandra McNeil, Ashley George, Laucresha Salmon and Michael Morgan in the Trinity College Fire-Fighting Home Robot contest recorded the fastest seek-and-extinguish time and was judged second for innovation.



OSU Fire-Bot Fans Competition

Fire-fighting is not a field typically associated with electrical engineering, but a senior design project gave some Oklahoma State University students the opportunity to apply quite practically their programming and sensor technology knowledge in extinguishing home blazes, if only in the form of a candle.

Students in the School of Electrical and Computer Engineering competed in the Trinity College Fire-Fighting Home Robot contest. As the first OSU team to participate in the nation's largest, public robotics competition, Sandra McNeil, Michael Morgan, Laucresha Salmon, Ashley George and Joe Dowlen placed tenth overall out of 65 international entries. Starting from scratch, without the benefit of a project constructed in previous years to improve upon, the students designed and built a robot that recorded a seven-second seek-and-extinguish time, the fastest in the competition, and was judged second overall for innovation.

The challenge, completed as part of the school's senior design II course, involved building a robot that, using sensor and mechanical drives, can locate and then extinguish a fire in an 8-by-8 foot, one-floor, scale dwelling. To actually enter their contest, teams building fire-fighting robots had to work quickly, according to Dr. Michael Soderstrand, professor and head of electrical and computer engineering.

"We had three different projects in the course this year for the students to work on, and unlike the other two competitions that are held during the summer, the fire-fighting robot contest was held before the end of the semester," Soderstrand says. "They had to finish the project in about three-fourths the time."

"We also were aware that this was an open, international competition with most of the contestants coming year after year, so we were also the newcomers," Soderstrand says. "A lot goes into success including technical ability, but the group has to be able to interface their individual responsibilities into one working design, and this truly was an exceptional group of students in terms of their ability to work together."

photo/Adam Huffer

A Yen for Soccer

Dr. Gary Yen, associate professor of electrical and computer engineering, is using the game of soccer to learn more about artificial intelligence.

For the past year, Yen and several members of the Freshman Research Scholars program have been studying how six micro robots can interact to play a game of soccer.

"The emphasis is not on robotics," says Yen, who directs the Intelligent Systems and Control Lab at Oklahoma State University. "It's on machine intelligence. How can a robot be equipped with human-like intelligence?"

A camera takes continuous frames of images of the robots' placement and sends the information to a centralized computer that evaluates their positions and tells them where to move next.

"As it is now, the computer tells the robots what to do and where to go," says Yen. "They rely totally on computers."

This delayed method of information processing and transmittal makes it difficult for the robots to interact successfully.

"Right now, one robot can kick the soccer ball into the field," says Yen. "We have a long way to go before we have them all actually playing and interacting a great deal."

Yen wants to develop robots that communicate with one another like humans do. "We want to know how we can equip machines with learning ability so they can improve interaction in their environment."

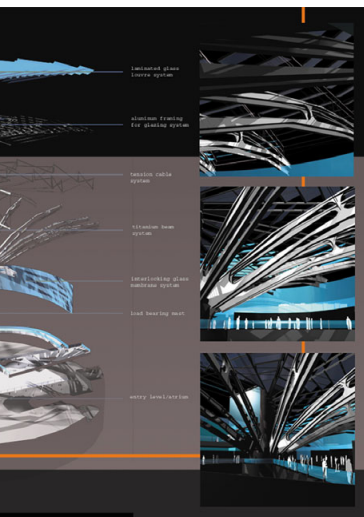
Yen is moving his research to the next level. This fall, he is studying soccer robots that use vision to communicate. "They have ample sensors and a camera and can function on their own, individually, without the aid of a centralized computer."

He hopes his research will eventually lead to robots that exhibit other human senses including hearing, smell, taste and feeling. "We want to try to duplicate human senses in a machine," he says.

Aiding Yen's research is a post-doctoral fellow, who has been working in the field of machine intelligence and response for more than 10 years.

Yen says his research findings could some day be used for educational and entertainment purposes and may even be applied to NASA space missions.

SHELLEY BRINSFIELD



Powered by Hydrogen

Vocal environmentalists including Vice President Albert Gore say replacing the internal combustion engine is an imperative step in the preservation movement. One notion holds that hydrogen power can substitute for gasoline and other petroleum products in vehicles.

In this year's senior design course instructed by Professors Jan Wagner and Rob Whiteley, chemical engineering students completed team projects evaluating the concept. The problem mirrored the American Institute of Chemical Engineers' (AIChE) National Student Design Competition, and asked students to conceptualize, design the size- and project the cost of a fuel cell power plant to run an automobile. Basically, the problem asked students to employ design information and ascertain the economic viability, safety and environmental effectiveness of hydrogen powered autos.

In chemical engineering senior design II, students are presented with a number of three- to four-week projects including futuristic problems that may be encountered on the job years from now. Relevant and timely projects, including one that originates in plants of the college's partner in industry, Hoechst Celanese, are also part of the course.



SALMON



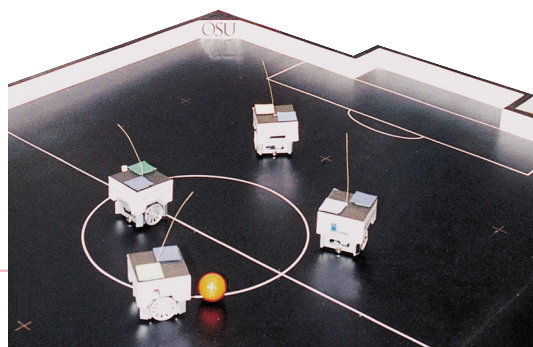
MCNEIL



photo/Andy Moore

YEN

OF curriculum design



photo/Adam Huffer

THE CHANGING face

A Clean Act

Once, the good fortune of selection for seasonal employment by the likes of Seagate or Los Alamos National Laboratories dictated whether an Oklahoma State University student could complement his classroom learning with the experience of actually fabricating computer chips in a world-class laboratory. With the completion of a Class-1000 clean room in the Advanced Technology Research Center, OSU's College of Engineering, Architecture and Technology now has in place a facility that rivals the private sector's most state-of-the-art in terms of capability and functionality. A major grant from the Noble Foundation in Ardmore made this dream a reality.

Location of the clean room in the center of campus fosters student access, and the proximity of an immediately adjacent teaching studio practically guarantees it. And there, design, fabrication and processing challenges originate in the real world rather than textbooks. However, the greatest advantage for scholars who spend time in the muscular, engineering arm of OSU's collaborative, laser and photonics research program may be the fact that

the professors spearheading ATRC clean room operations work 25 light years ahead of the times.

"To take existing technologies and techniques and solve applied problems is a conventional category of research," says Dan Grischkowsky, Henry and Shirley Bellmon Professor of electrical and computer engineering. "But our effort is different. It is in the nature of exploration. One can make extraordinary impact on the world by defining new ways of doing things so that's what we try to do."

Combining optical and electrical techniques, the research team headed by Grischkowsky and Alan Cheville demonstrates bandwidth and pulse-width performance as much as 100 times faster (shorter) than achievable with purely electronic methods. When conventional hardware catches up, the transmission of information may occur at rates that approach terabit, a factor of 200 faster than today's best-performing fiber optics. For now, the techniques they developed allow them to drive optical switches faster than any other methods on Earth and generate laser pulse sources of terahertz radiation. Measurement studies – on combustion, predicting radar

performance for the U.S. Army and signal propagation on computer chips – that were impossible with prior, short wavelength lasers became feasible.

"Using these terahertz pulse sources, we have been able to conduct investigations that just weren't possible with existing technologies," Grischkowsky says. "Our far-infrared probe allows us to sense and make measurements on extremely hot, combustion constituent samples in a region of frequency that previously was inaccessible.

"We have seen flame features, in terms of water spectroscopy, that have never been seen before."

The team's project on the propagation of optoelectronic signals on microprocessors requires custom made chips, until recently supplied solely by Grischkowsky's colleagues at IBM. With the completion of the clean room, the researchers have the capability to not only fabricate chips, but to also get students involved in the process. Although employment for electrical and computer engineers is considerably more applied than Grischkowsky and Cheville's research, their labs are model training grounds for students.

"It's necessary for students to have the engineering knowledge they gain from classes, but it's also important that they know how to apply it to important problems," says Cheville, assistant professor of electrical and computer engineering. "We're doing very high-tech stuff, but it requires applied, practical hands-on skills."

The opportunity is no longer limited to the 19 undergraduate, graduate and Ph.D. students who comprise Grischkowsky and Cheville's research team. A glass wall separates the clean room from an adjacent teaching studio where, this fall, visiting professor Marcus Wolf is instructing the School of Electrical and Computer Engineering's inaugural course on micro-fabrication processes.

From within and just outside the recently completed clean room in the ATRC, electrical and computer engineering students are supplementing their classroom education. Undergraduates Katrina McClatchy and Michelle Castle work alongside visiting professor Marcus Wolf inside the laboratory while other students and Alan Cheville observe from the adjacent teaching studio. Plans for the facility, which was made possible by a major grant from the Noble Foundation, include the installation of web-cams in order to broadcast on the Internet clean room activities such as microchip fabrication.



GRISCHKOWSKY



Grass to Gas

Many experts believe that "Grass to Gas," or more specifically, biomass to ethanol conversion and the business therein, will launch a second agricultural revolution and begin the revitalization of rural economies. "Grass to Gas" development is a burning issue for a diverse group of researchers at Oklahoma State University.

"Grass to Gas" is actually many ongoing projects with the common goal of improving the gasification/bioreaction conversion of grasses and other inexpensive biomass into clean-burning ethanol. The process uses "bugs," or microorganisms that make the conversion more efficient. Headed by the Division of Agricultural Sciences and Natural Resources and the Oklahoma Agriculture Experiment Station, the project has drawn participation from molecular biologists, biochemists and economists at OSU and OU, as well as School of Chemical Engineering faculty members A.J. Johannes and Randy Lewis.

OSU researchers – and the fuels industry leaders, legislators and farmers whose attention it has caught – are convinced that "Grass to Gas" has impending application for four primary reasons:

It will revitalize rural economies because "Grass to Gas" utilizes low-value raw products that can be grown on marginal cropland, and conversion plants may be built in communities throughout the state.

"Grass to Gas" conversion is more efficient than other ethanol production processes because it utilizes the entire plant, not just a small portion such as the grain.

Ethanol production reduces America's dependency on foreign oil.

Ethanol is environmentally friendly, burning cleaner than fossil fuels and reducing greenhouse gas emissions.

photo/Todd Johnson



Okie Oil

Oklahoma brought together the farmer and the cowman. And here, via the efforts of a university consortium, the petroleum industry and the U.S. Environmental Protection Agency have entered their own multi-million dollar kinship.

Researchers at OSU, the University of Tulsa, the University of Arkansas and the University of Oklahoma established the Integrated Petroleum Environmental Consortium (IPEC) to aid the global competitiveness of domestic oil producers. IPEC is developing cost-effective solutions for environmental problems that represent some of the industry's greatest challenges. Critically low prices have made the consortium's mission all the more relevant.

According to Dr. Khaled Gasem, an associate director of IPEC and R.N. Maddox Professor of chemical engineering at OSU, the consortium unites academia, industry and government to identify research needs and procure and disseminate funding to investigators at the participating institutions for the development of transferable, environmental technology. Participants work collaboratively to ensure that projects are pertinent, proposals meet EPA specifications and that the consortium is non-political.



GASEM

"No matter the department, if a researcher is at TU, Arkansas, OSU or OU, he or she is eligible to compete for IPEC funding," Gasem says. "There are IPEC representatives like us at each of the institutions, and we invite people interested in pursuing an environmental research project to seek us out."

IPEC has received more than \$3 million from the EPA and state agencies in the last two fiscal periods, including \$1.5 million in recent funding for a third round of proposal submissions this year. Researchers who have received grants in the first two rounds of proposals have also acquired considerable matching monies.

Projects that have received consortium funding include the use of plants to clean contaminated soils; natural degradation of gasoline by microorganisms in the absence of oxygen; using petroleum sludges as road materials; the control of the formation of toxic hydrogen sulfide in oil wells; development of simple sampling devices to replace live organisms to assess toxicity in contaminated soils; and the treatment of naturally occurring radioactive material in oil production equipment.

ADAM HUFFER



Joseppi's Warms to OSU Heat Pump Research

Few eatery owners would allow university researchers to dabble with their climate control, even with the promise of saving a few bucks. However, Stan Clark did not become a successful restaurateur without taking a few risks.

Of course, with the world's leading experts on geothermal heat pump technology headquartered up the street at OSU as well as performance and cost-effectiveness assurances from his contractor and company's own director of operations, Clark's decision to incorporate a heat pump in Joseppi's was made with confidence.

The massive, hybrid system ensures the coolest new restaurant in Stillwater this summer will also be the hottest and safest in town come winter.

"We were looking for ways to reduce our energy costs, and our contractor, Lynn Vick of Air-O Heat and Air Conditioning came to us with the idea," Clark says. "OSU's comment to us was, 'this will put us light years ahead to have a facility this close to campus that serves as a working example of what the technology can do.'"

Working alongside contractors during Joseppi's construction, OSU researchers helped install almost 40,000 feet of loops in traditional horizontal bores and 200-ft. deep vertical bores, more than enough to support its climate control. However, just beneath the parking lot and walkway leading to the entrance also lies 45,000 feet of shallow heat rejection loops.

"Our Department of Energy contract requires an industry component, and few enterprises have heat dissipation loads that match a restaurant's," says Jim Bose, head of the Division of Engineering Technology and executive director of the International Ground-Source Heat Pump Association. "This hybrid system combines proven technology with the new, shallow heat rejection loops that we believe will speed heat exchange by dumping heat closer to the surface."

OF research endeavors



The Colvin Center Annex is the site for graduate student Sarah Markes' thesis project. Under the tutelage of Robert Emerson, an assistant professor who joined the School of Civil and Environmental Engineering this past year and specializes in timber structures, Markes is evaluating decay in the beams that support the facility's roof. The study involves using non-destructive means - ultrasonic wave inspection in this instance - to predict the internal condition of timber. Undergraduate Jennifer Prichard (left) sends a wave through the beam that Markes captures with a transducer while Emerson records the time duration.

THE CHANGING face



Brandon Moore

With his wife Carolyn and their young children, Dakota and Brandy, in mind, as well as his extended university family, Brandon Moore chose to break ground on his employment with Top-400 contractor, Manhattan Construction on conceivably the most daunting project he will ever work in his career ... the OSU Athletics Center.

"I told them when I was negotiating for the job that I wanted to keep my family in Stillwater, and they said we could stay here from start to finish," Moore says. "Getting to work on one of the most unique projects in all of the Southwest also made it a pretty sweet deal."

A professional and educational journey that began in California and included stops in Colorado eventually brought Moore and his family to Stillwater where he initially planned to complete a degree in civil engineering.

"My intentions were to come out here, get my degree and head back to Colorado Springs to join the civil engineering firm where I had been working," he says. "But we liked Stillwater and Oklahoma so much, we decided to stay, and I changed majors to construction management technology."

Brandon Moore stands in the center of the floor in the midst of the Gallagher-Iba renovation. The project, which doubled the size of the arena, was the first of the 1999 construction management technology graduate's employment with Manhattan Construction.

Only a few hours transferred, and a couple of years became four. For much of that time, Moore paid his way through school and supported his family with his own company, Stillwater Construction Inc., that built custom homes in Perry and Stillwater and as far away as Piedmont.

"Some professors would send students my way, and they would also ask my practical advice on certain things," Moore says. "But I benefited from the experience mainly because it helped pay the bills."

Moore is now one of three CMT alumni on a management team that coordinates the activities of countless independent contractors and a crew that he approximates at 200 any given day. The complexity of the Gallagher-Iba expansion, as well as its eminence, was the reason the 1999 graduate chose Manhattan over other companies courting his services.

"It's a lot easier to go from bigger projects to smaller ones than the other way around," Moore says. "When you start out on a project like this, building \$5 million strip malls or \$10 million Wal-Marts won't seem so difficult."

He says the project has been as challenging as it appears from the outside.

"Although it's a \$52 million dollar project, it has the complexity of a \$100 million-plus project because we're tying in a new building to an existing structure while keeping it open to the owner year-round," Moore says. "I thought it would be a great job to get my feet wet on, but sometimes, I've been soaked."

"When you begin to feel that you're in over your head, you realize that you've got so many great people working around you. It doesn't hardly faze you," he says.

Moore says bringing his children to sporting events at Gallagher-Iba will always be special, and not just because of the excitement of OSU athletics.

"One of the great things about this industry is you get to say with pride about monuments like this, 'I helped build that,'" he says. "Everyone, including the owner, the architect and Manhattan, has worked very hard to get this done, and we can all be proud of a facility that will be here long after we're gone."



MILLS

Justin Mills

Justin Mills is on a fast track to success. The CEAT graduate has come a long way in a short time since completing his studies in architectural engineering at OSU in 1997.

Mills has completed his master's degree at MIT and been admitted as a Ph.D. candidate. But that's not all. This 26-year-old is busy running his own computer software company — one that specializes in enabling geographically distributed teams to work together via the Internet.

"I began my Ph.D. last year working under Professor Feniosky Pena-Mora in the area of web-based collaboration," says Mills. "In January, Several other students and I working in the same area of online collaboration, along with Professor Pena-Mora, developed a startup concept."

The startup company received seed funding in December, and Mills and the others began working part time, immediately changing the focus from computer-to-computer collaboration to multi-device collaboration.

"Computer-to-computer collaboration involves communication between two computers that allows someone to chat, view video, show presentations or share documents," says Mills. "Multi-device collaboration introduces alternative devices to the mix such as phones, palm pilots and web-enabled cellular phones that allow participants to be more mobile."

Mills says he is applying what he learned at OSU to his company.

"Although I'm not currently working as an architectural engineer, my architecture training is helping me more than I probably realize because some of what I am doing involves high-level system architecture design for our software product."

He credits his well-rounded education with giving him the tools to succeed. "It helped my time management greatly," he says. "I started out in architecture working long days and a lot of nights to complete projects, but by the end of my degree program I worked more structured hours to accomplish the same amount of work at the same quality. I also gained a great respect for art and the artistic qualities that can be found in anything. It's hard to believe that I see art in a computer program, but it's there — if it's done right."

Mills has put his Ph.D. on hold — for now.

"I recently decided to sit out of MIT for awhile and work full time for the company," says Mills, "where I hope to continue having a broad role including the design of the overall architecture for the system." Mills says he does plan to return to MIT someday to complete his Ph.D., but for now, "I am enjoying professional life, or as professional as it gets in a startup."

OF young alumni

Cherie Rees

Cherie Rees, 1993 CEAT civil engineering graduate, refuses to be pigeonholed.

In her brief career, Rees has held a variety of positions, all within the same company. The diverse career ladder has taught her an important key to success: always keep your options open.

"I started my career with Mapco where I was hired into a rotational engineering training program," says Rees, who also holds a master's degree in civil engineering from OSU.

During her time at Mapco, Rees rotated to positions in engineering, marketing and finally landed a spot as supervisor for risk management, the position she held until two years ago when Mapco merged with Williams.

Rees now works as a marketing representative at Williams Energy, where she negotiates gathering and processing agreements with gas producers.

"My job is to negotiate agreements to transport, treat and process gas from the well head to the mainline gas pipeline," says Rees, who is scheduled to complete an MBA at OSU-Tulsa this fall.

Although Rees doesn't work as an engineer, she says her engineering education is extremely useful in her job. "My engineering classes taught me how to organize a project and get it done."

She says the technical knowledge students acquire while in school also helps. "Having an engineering background gives me an edge," she says. "Understanding how gas is transported and treated helps me work with my customers whether they are my marketing counterparts or field operations personnel."





photo/NASA Dryden Flight Research Photo Collection

Valerie Gordon

For aerospace engineers, few career goals are loftier than working for NASA, but Valerie Gordon has always aimed high. The 1997 mechanical engineering (aerospace option) graduate set her sights on a job with America's air and space program well before enrolling at OSU.

"My goal since high school had been to work for NASA, but when I got to college, the likelihood of that seemed very slim," she says. "I don't know if it's luck or fate, but life's been good to me."

Gordon is an aerospace engineer in the Controls and Dynamics branch of the Research Directorate at NASA Dryden, the heart of flight testing for NASA and U.S. military vehicles. In the two years of her employment, she has worked on the X33, a prototype of a reusable launch space vehicle, and UCAV, an autonomous, or pilotless, combat air vehicle.

Gordon attributes her employment at Dryden, which was preceded by a term with an engineering contractor in Texas, to the education and academic advisement offered at OSU as well as one great first impression. While president of OSU's American Institute of Aeronautics and Astronautics student chapter, Gordon attended a joint meeting in Oklahoma City of student and professional members.

She approached and later sent an e-mail to the guest speaker, a research engineer from NASA Dryden, commending her presentation.

"She talked about her work on the SR71, and I told her how exciting I thought the project and the position, 'research engineer,' sounded to me," Gordon says.

More than two years later when a position opened, the research engineer went looking for the student who so enthusiastically expressed an interest in employment at Dryden.

"She brought up my name, and they contacted the school, obtained my forwarding address and, as they say, 'the rest is history,'" Gordon says. "At OSU, they constantly told us that it helps to get involved in activities in college and get your name out there, and I'm a living example of how networking can work."

OSU's unique aerospace curriculum armed her with the skills to jump right in alongside researchers at the Mojave desert facility where historic aviation events, like the breaking of the sound barrier, can happen any work day, Gordon says.

"The aerospace program at OSU has a true flight test course that most programs don't offer, a component that is extremely relevant to what we do here," she says. "There are people here from a lot of outstanding programs, but OSU was a great foundation for me."

Gordon remains as enthusiastic today about her job as she probably seemed at the AIAA meeting in Oklahoma City more than four years ago.

"There are open hangers everywhere filled with experimental vehicles, and for employees to get up close and personal to them requires only a phone call or a handshake with a crew chief," she says. "And there are plenty of simulators they allow us to fly when time allows."

She hopes her fellow CEAT alumni will give Dryden a look.



GORDON

Terry Dark



DARK

Terry Dark has not only fulfilled his desire to become a practicing engineer, now he's helping others obtain the same goal in his new job as adviser and recruiter for OSU-Tulsa's engineering and technology programs.

After graduating from OSU in May 1998 with a bachelor's in chemical engineering, Dark worked two years as a combustion engineer for Tulsa's John Zink Co., a subsidiary of Koch Industries.

"I really enjoyed the technical aspects of my job," he says. Dark's responsibilities included ensuring fired heaters produced by the company met the specific requirements of its customers.

"We designed the prototypes, then fine-tuned them to meet our customers' needs."

Dark also worked closely with OSU to recruit graduates for Koch Industries. "I knew the excellent preparation OSU engineering students receive," he says. As an undergraduate, Dark helped Virgil Nichols, director of Engineering Student Services, implement educational and extracurricular programs for engineering students.

When the position at OSU-Tulsa opened to recruit and advise students in the engineering program, Dark knew it was a perfect opportunity for him.

"I've always enjoyed working with students, and this gives me the opportunity to interact with young people interested in the engineering profession," he says, "and to work with older, non-traditional students who want to hone their professional skills."

"My engineering background is an advantage when I'm helping engineering students make decisions about their future," he says. "And recruiting is easy when you know and believe in what you are selling."

"I can look students in the eye and tell them this is the best educational value I know of because it's definitely worked for me," says Dark, who is pursuing a master's degree in engineering and technology management at OSU-Tulsa.

Engineering and technology program graduates will find that their problem-solving capabilities will open all types of doors for them professionally, he says.

"It all depends on what you enjoy doing," Dark says. "An engineering degree gives you the flexibility and the potential for a lot of upward mobility."



VADDER

Davey Joe Vadder

Since Davey Joe Vadder graduated with a bachelor's in biosystems and agricultural engineering in 1999, he has been to Ghana, the Ivory Coast, Liberia, Honduras, Qatar and, most recently, was part of an entourage that accompanied Secretary of State Madeleine Albright to Argentina. Aside from the destinations, he can divulge little about his travels and employment with the Bureau of Diplomatic Security for the U.S. State Department.

"I love my job, and I can't imagine landing a better one right out of college," Vadder says. "The unfortunate part is, I can't tell anybody about it."

Security engineering officers like Vadder "are responsible throughout the world for the protection of Department of State personnel, facilities and sensitive information from acts of crime, terrorism and technical espionage," according to his official job description. Technical security assessments and technical countermeasure surveys at 260 locations around the globe are part of the work, but specific details are much more difficult to ascertain. His work with Albright's entourage, however, provides some insights.

"Whenever the Secretary travels, she is accompanied by a large group including Diplomatic Security agents and one security engineering officer," Vadder says. "The agents do the physical type protection. They carry guns, while the security engineering officer does the technical, engineering type work to ensure safety."

"I won't go into the things I did as the engineering officer on that trip, but I didn't meet her once during the entire time we were down there."

Interestingly enough, Vadder learned of the position at the 1998 CEAT Career Fair.

"There were all these guys wearing suits who looked like they came from the 'X-Files,' and they asked, 'would you like a job that offers worldwide travel and to do things like look for espionage devices?'" Vadder says.

The self-acknowledged "tinkerer" jumped at the opportunity.

"I went through an 11-month training program and learned things you can't in college," he says. "Although I was the only agricultural engineer in my class, and as far as I know, I may be the only one here, I felt very prepared with my degree because our curriculum was very broad-based."

"I realize it's very different from the type of job you would associate with agricultural engineering, but our department at OSU sends students to all kinds of areas," Vadder says. "Nevertheless, whenever I tell someone I'm an agricultural engineer, they inevitably ask, 'why did you come to work for the State Department?'"

Vadder is currently based in Rosslyn, Virginia, but is awaiting a long-term assignment. Most of his classmates from the training program have already taken posts overseas. The engineers bid on the assignments then serve three-year terms before being rotated to another post.

"You can spend a maximum of six years in Washington," Vadder says. "I'm not sure when I'll receive word, but I am bidding on another domestic assignment with hopes to head overseas in a couple of years."

Darby Pope

George Darby Pope always knew he wanted his college education to benefit other people as much as himself.

"I wanted to work with people directly and to give something back," says Pope, who hopes to eventually follow his parents' footsteps into missionary work.

"When I was in seventh grade my family moved to China, where my parents were English teachers," says the Kansas native. "Originally I thought I could help other people through engineering, and later I decided a medical mission would be a great way to provide service to others."

Shortly before graduating from OSU in 1995 with a degree in chemical engineering, Pope accepted a job as a chemical engineer with Conoco in Houston, Texas. At the same time, he also learned he had been accepted to Johns Hopkins Medical School.

"I had always considered the field of medicine, so throughout my college years I made sure I took the prerequisites I needed," says Pope, who graduated from Johns Hopkins Medical School in Baltimore, Md., in 1999.

Pope is currently in his second year of residency in general surgery at Dartmouth-Hitchcock Medical Center in Hanover, N.H. He spent his internship (first year of residency) working there and at a Veterans Administration hospital gaining a broad range of experience in various surgical specialties and surgery procedures ranging from hernia corrections to lung resections.

Wendy Rachel

Wendy Rachel means business.

The civil engineering graduate and environmental project manager at Koch Industries plays a key role in negotiations of the company's property acquisitions. Her recommendations could make or break a deal – literally.

"I spend most of my time identifying environmental risks associated with property and assets that Koch is considering for acquisition," says Rachel. "I perform cost analyses to find out what will be required to bring a facility into environmental and safety compliance and up to Koch standards."

In addition to risk assessment, Rachel is managing an initiative to ensure compliance with certain OSHA regulations at Koch facilities throughout the country.

"Maintaining consistency in our compliance initiatives across such a diverse company is a challenge, but something Koch management strongly supports. We have assets in almost all 50 states," says Rachel. "Koch is primarily an energy company, but we also own cattle ranches, chemical technology manufacturing plants and asphalt plants, among others."

The Edmond, Okla., native credits her engineering education at OSU with helping her succeed in the business world. "In my position, I have to be able to explain technical information to non-technical people," says the former Concrete Canoe chief. "Thankfully, at OSU there's not just an emphasis on the technical side. Students also learn to speak well, write well and to work in teams."

As for her future, Rachel wants to develop her engineering skills related to environmental remediation and work with state agencies on soil and groundwater clean-up projects.

"Engineering gave me a great background in science and scientific investigation from research," says Pope, who met his wife, Sarah (Constantikes) of Clinton, Okla., a fellow chemical engineering major, while attending OSU.

They married after his first year at medical school, and she completed her chemical engineering degree at Johns Hopkins. Currently she's busy as a full-time mom to their children, Ellie, 2 years old, and Abigail, 2 months old.

"The chemical side of engineering leans toward the medical field," Pope says. "There's a lot to do with the chemistry and physiology of the body. Many math and engineering-type principles are used to determine how a body will react in certain situations."

Pope first considered applying to Johns Hopkins after he and others in the CEAT Scholars Program visited the Johns Hopkins chemical and biomedical engineering program.

An engineering background is excellent preparation for a medical career, he says. "Engineering prepares a graduate for whatever field he or she wants to pursue. It teaches a lot of management and leadership skills."

"I've had a lot of interaction with graduates of the Ivy League schools, and truthfully I would pit an OSU engineering education against any of those."

"The students at OSU are top caliber," Pope adds, "and I wouldn't trade my experience there for anything."



POPE





John P. Lloyd

John Lloyd took a position with the School of Civil and Environmental Engineering in January 1970. He proved to be a fast mover. Just over a year later, he took the hand of Heather MacAlpine, the daughter of senior civil engineering faculty member David MacAlpine. The “civil” ceremony in Bennett Chapel was a celebration for the school’s structures group. Joining the groom and father of the bride in the wedding party were ushers Bill Dawkins and Sam Kiger.

After 30 years with the school, Lloyd retired in May. Trips to the lab during his 30-year tenure were like entering a seismic zone, according to Robert Hughes, professor and head of the school.

“He had many research projects ranging from blast loadings on concrete beams to weathering of concrete pavements to steel pipeline connections,” says Hughes, “but the sounds of shaking, pounding and ramming were music to John’s ears.”

Heather also retired this year from her position as head of Special Collections and University Archives at the Edmon Low Library. The couple plans to remain in Stillwater. When not camping and fishing in Wyoming and Colorado, Lloyd has his garden and woodworking shop to occupy his time. He will also continue to participate in research and serve as a mentor to young faculty.

OF faculty retiring



Richard Whitney

Richard Whitney once took two vans of students to Pennsylvania to give presentations to New Holland company officials, the sponsors of their senior design class projects that year. Pressed for time, the group headed back in the midst of a snowstorm.

“They were in two vans, and he brought them back in the middle of a snowstorm,” says John Solie, a fellow biosystems and agricultural engineering professor. “He was always doing things like that for students.”

Whitney’s exams were legendary for their difficulty, but only because he expected the best of students. His contributions to the school’s senior design course include increasing the number of participating sponsors, and he was particularly instrumental in developing the school’s exchange with a university in the Netherlands, according to Solie.

“Dick worked with several faculty on establishing the relationship, but he essentially raised all of the funding to get our students some international travel experience,” Solie says.

Whitney retired in 1999 after a 31-year career. He is currently pursuing his recreational and professional interests in aviation. Whitney is providing consulting expertise nationwide on aerial application of pesticides, his research interest at OSU, and working toward an instruments rating for his pilot’s license.

Lowery Ending 39-year Tenure

During a reception hosted April 25, one of his professional colleagues remarked that “Dick Lowery is a friend to more people than most of us know.” Considering just the 110 students who earned master’s degrees under his tutelage and the 17 Ph.D. candidates he sponsored at OSU, the statement is undeniable.

After 39 years in the CEAT, Dr. Richard Lowery has retired from teaching. He will continue in a reduced, emeritus role for at least the next year, but the official departure of mechanical engineering’s elder statesman from full-time duty leaves a void almost impossible to fill, says Dr. Larry Hoberock.

“In his capacity as lab director, adviser, mentor, seasoned researcher and respected teacher, he wore many hats,” says Hoberock, professor and head of the School of Mechanical and Aerospace Engineering. “We’re not sure what we’d do without him so we’ve asked him to stay on.”

Lowery’s legacy at OSU will be nearly impossible to duplicate. He chaired mechanical engineering’s lab committee for 34 years and the faculty tenure committee for 14 years. He is the innovator behind six courses currently taught in the school. Literally hundreds of undergraduates have taken his classes, including the sons and daughters of students who followed their parents to OSU. And at least seven of Lowery’s students have already retired from their professional careers.

Lowery relished teaching design and instrumentation, particularly instructing graduates and undergraduates alike in experimental

work. He took a personal interest in students, often remarking if they appeared to be neglecting their families, according to Hoberock.

“Dick would tell students, ‘your marriage is more important than your thesis. Next time, bring your wife with you to the lab,’” Hoberock jokes.

For 35 years, Lowery taught the school’s senior design course, developing relationships with hundreds of sponsor firms. Through that experience, and his own research collaborations, he gained invaluable knowledge of companies across the country.

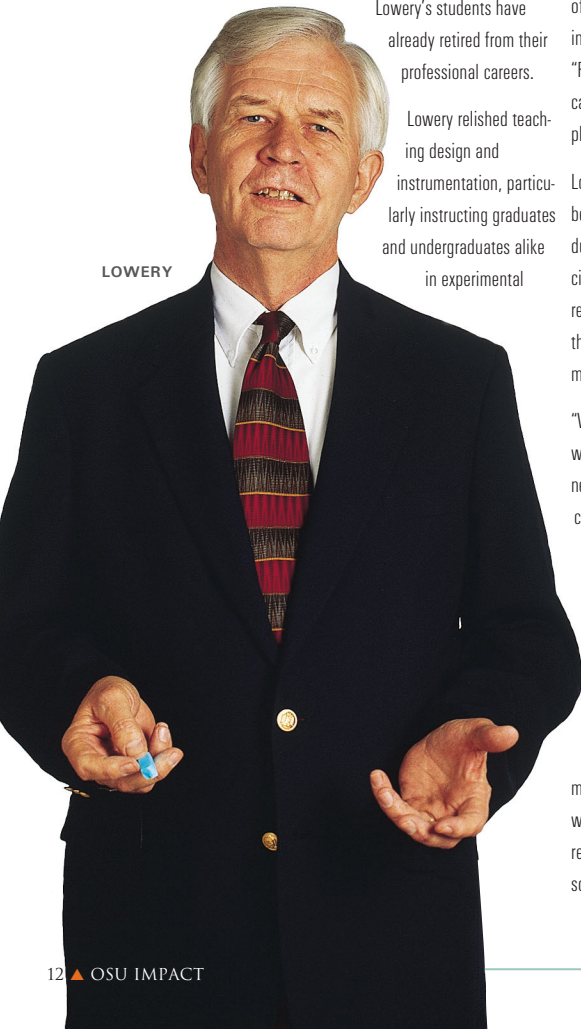
“Dick has been the school’s guru of academic and career advice, and we can’t begin to count the number of students he has helped get jobs, including my son,” Hoberock says. “Former faculty and students still call him for advice when contemplating a career move.”

Lowery and his wife, Anne, have become friends with many people during their years in Stillwater. He cited the OSU community as the reason they came back in 1961 to the institution where he earned a master’s degree in 1958.

“When there was discussion about what the school could offer to attract new faculty, I’d say, ‘people don’t come for the things we don’t already have here,’” Lowery says. “They come for the quality of life I don’t think a lot of other places have.”

Humility precludes Lowery’s use of the word to describe himself, but he still calls noble the profession he chose more than 40 years ago. Few would dispute that with Lowery’s retirement, the university loses some nobility.

ADAM HUFFER



LOWERY

School of Architecture Legends Move On

By his own admission, John Bryant would have called crazy any prediction at his 1964 graduation from the School of Architecture that he would return 13 years later as department head to lead the rebuilding of OSU's once-proud program into its former glory. The Fellow in the American Institute of Architects (FAIA) and inaugural winner of the AIA Oklahoma Leadership Award for Education never intended on becoming a teacher.

The son of OSU alumni – the late Glenn Bryant, onetime Electrical Engineering Technology department head, and his wife Bernice, a 4.0 graduate with a double major in math and biology – John Bryant's familial association with OSU dates back to 1928. He was literally raised on campus, spending hours in the library reading books about Japan and China. His interest in Asia was manifested years later when, as a professor at Auburn University, Bryant became one of two architects in the country to receive Fulbright Fellowships, and spent a year in Tokyo. It was at the end of that yearlong stay in 1976 that his alma mater called.

"OSU had one of the finest schools of architecture in the country in the '40s, '50s and early '60s, and then it went through a kind of decline in terms of strength of professionally oriented education," Bryant says. "Mark Jaroszewicz came in around 1974 and was given a mandate to hire some mid-career faculty and bring the school back to the professional level."

"When he left two years later to become dean of architecture at the University of Florida, I was asked to apply here for the head position," Bryant says.

The university's commitment to rebuilding the program was among the reasons Bryant accepted the position and daunting challenge.

"Thanks to the support of Ken McCollom and Dean Lohmann before him, as well as Jay Boggs who was vice president for Academic Affairs, we were able to rebuild the school over a very short period," he says. "We robbed some of the finest schools in the country of their top faculty – Bill Haire from Auburn, Bob Heatly from Texas A&M, Bob Wright from Georgia Tech and Jim Knight from Illinois."

"These people were willing to give up quite a bit of their own individual glory to be in a real team orientation with other good people," Bryant says. "Looking back, it was just wonderful."

In 1985, Bryant relinquished the department head position to return to full-time teaching. He officially retired from the school in May to pursue his interests in writing, documentation of Asian architecture and to construct a house on property he and his wife, Linda, own on the San Juan Islands near the coast of Washington.

BOB HEATLY

The 1998 Association of Collegiate Schools of Architecture (ASCA) Distinguished Professor retired from the CEAT in December 1999 and headed to his villa in France to renew his artistic pursuits, leaving one of the most impressive studio instruction records in OSU School of Architecture history. More than 100 students critiqued by "the Heat" won or placed in national and international design competitions during his tenure.

"Bob was one of the most demanding teachers in the school. He expected the best from his students, and he got the best performance from them," says Randy Seitsinger, professor and head of the school. "In some mysterious way, he could push the right buttons and students would respond with incredible performances.

"He set the tone and the standard for design excellence in the school."



BRYANT HEATLY HAIRE

photo/Adam Huffer

Heatly joined the School of Architecture in 1978. Like Seitsinger and many of the rest of the school's faculty, he too is an alumnus.

"The greatest aspects of this school have been the people and the way they teach," Heatly says. "Other schools focus on research or other things and not teaching like we do here. The priority is one-on-one instruction."

BILL HAIRE, FAIA PROFESSOR

Bill Haire was known in the School of Architecture as a person of the utmost integrity, an approachable source of fair, insightful advice frequently tapped by students and faculty alike. The mild-mannered, yet passionate crusader for things that he believed in was, however, perhaps better known around the school for an altogether different trait.

"When Bill would get here in the morning, he would put on any one of several lab coats he kept hanging behind his office door," Seitsinger says. "He would wear it all day while he worked, then take it off right before going home."

Haire was not above some good-natured ribbing about his work clothes, although he was hard-pressed to explain their origin.

"I once asked him about the coats because they had become such a good joke around here, and although he didn't exactly remember when he started it, he said they were comfortable and convenient because they had all these big pockets for chalk and other things," Seitsinger says.

When Haire retired in May, the school retired his favorite lab coat.

"We framed the baby blue one like you would an old jersey and presented it to him," Seitsinger says. "As sort of a tribute to Bill Haire, we said that no one in the school will ever again wear a lab coat."

In his retirement, Haire plans to complete a book on financial management and continue to develop continuing education for architects. His handbook/home-study course, *Developing a More Profitable Architectural Practice*, is a mainstay on professional architects' bookshelves.

Don Norvelle

ASSOCIATE PROFESSOR,
MECHANICAL ENGINEERING
TECHNOLOGY

Before he ended his 20-year legacy in the Division of Engineering Technology, Don Norvelle had one more chapter to write.

OSU mechanical engineering technology students were the first in the country to use the text, "Electrohydraulic Control Systems." Published in December by Prentice Hall, the book is Norvelle's second as the sole author. It is the first to fully integrate electronic control and hydraulic and pneumatic power applications.

Norvelle compiled his manuscript from years of lecture notes, beginning with lessons he put together in developing OSU's first course in electrohydraulics 10 years ago.

"Where we now have a complete laboratory for the electrohydraulics course, I started with just one solenoid," Norvelle says.

Although inclement weather thwarted Norvelle's attempt this year to break his own 15-hour record, round-trip bicycle trek across Oklahoma, his demeanor suggests another try is probable. Following his retirement, Norvelle plans a cross-country bicycle tour and will instruct seminars for Colorado-based National Technology Transfer. Right now, however, he is content to celebrate the publication of his second textbook.

"It's always special to have a textbook published, but it has been particularly rewarding to see this one come about," he says. "It really caps off the things that I've tried to do here at OSU."



photo/Andy Maxey

Noteworthy

Select Faculty Honored



Ghajar

The Oklahoma State University Board of Regents has named **Afshin Ghajar**, professor of mechanical and aerospace engineering, and **Ranga Komanduri**, professor of mechanical and aerospace engineering, Regents Professors. The title of Regents Professor is bestowed to recognize a scholar or creative artist of exceptional ability who has achieved national and international distinction.



Komanduri

Heating, Ventilating, and Air Conditioning Analysis and Design, the textbook penned by the School of Mechanical and Aerospace Engineering's Professor **Jeffrey Spitler** and emeritus Professors **Jerald Parker** and **Faye McQuiston** has been released in fifth edition. Adopted by more than 125 universities, it is the largest selling HVAC text in the world.



Spitler

Bill Kolarik, professor and head of the School of Industrial Engineering and Management, has authored another textbook, *Creating Quality: Process Design for Results*. The follow-up to *Creating Quality: Concepts, Systems, Strategies, and Tools* was published by WCB McGraw-Hill and has been adopted by universities in North America, Europe and Asia.



Kolarik

Karen Bloodworth, local government specialist with the Center for Local Government Technology, received the Don C. Stone Award for Education from the Oklahoma Public Works Association. Bloodworth was recognized for coordinating 22 educational programs since 1993 that reached more than 50,000 American Public Works Association members in North America.



Bloodworth

Jong-Moon Chung, an assistant professor in the School of Electrical and Computer Engineering, took first place in the Outstanding Paper Awards at the Institute of Electrical and Electronics Engineers' Electro/Information Technology 2000 Conference. Chung received the award in recognition of the paper "The Analytical Decoding Performance of Majority-Logic-Like Vector Symbol Codes" co-authored with John J. Metzner.



Chung

David Lilley, professor in the School of Mechanical and Aerospace Engineering, received the George Westinghouse Gold Medal from the American Society of Mechanical Engineers at the organization's International Joint Power Generation Conference. Established in 1952, the award recognizes "distinguished contributions as a teacher, researcher and consultant in power engineering including the publication of quality scholarly papers and studies on safety, energy efficiency and environmentally compliant power systems." ▲



Lilley

Phillips Engineering Scholars Update

Three years ago, **Erica Snider** became part of the first class of the CEAT's Phillips Engineering Scholars program. She was new to OSU, new to the CEAT and new to the world of engineering.

But all that's changed. Today, the industrial engineering and management senior from Hominy, Okla., is well on her way to a successful engineering career, thanks to Phillips Petroleum.

Each year, Phillips Petroleum gives \$200,000 to the college to help fund the unique program. Participants receive scholarships, professional and personal development opportunities and two-week, study-abroad experience.

As a Phillips Engineering Scholar, Snider has traveled to Singapore and Japan to tour some of the world's most progressive firms and spent time in Bartlesville and Washington D.C. touring Phillips' research and development labs and meeting with its executives.

Snider regularly corresponds with her mentor at Phillips Petroleum, a female engineer who offers advice on academics, career choices and internship opportunities. "It's great because I've made contacts with a number of professionals. It's a real advantage to feel like you can network with them and ask for their input and advice."

Snider also appreciates the payment of tuition and on-campus room and board that Phillips provides. "The program is not just a scholarship program — there's so many other great things that go along with being a Phillips Scholar, like the travel and professional development opportunities."

"However," says Snider, "it is nice not having to worry about finding money in my pocket." ▲



Circa 1997



Snider

Who What When Why

Student digest

SCHOLARSHIP IN SPAIN



Engle

Jeff Engle, a junior in chemical engineering, was recently awarded a Bailey Scholarship. The award allowed Engle, who is completing a minor in Spanish, to spend the summer semester studying middle level Spanish and Business Spanish at the University of Salamanca in Spain.

AMONG OUR BEST



Casias

Representatives of the OSU student chapter of the Society of Hispanic Professional Engineers attended the SHPE Region V – Regional Student Leadership Conference in El Paso, Texas, October 15-18. At the gathering of 42 SHPE chapters from institutions in the 11 states that comprise Region V, the OSU team including students **Juan Molina**, **Chris Gammon** and **Adrian Casias**, won the regional Academic Olympiad. They represented OSU and all schools in Region V at the national SHPE conference, capturing fourth in the national championship. Also at the meeting, an original design by OSU student **Marita Sanchez** was selected as the official Region V logo.



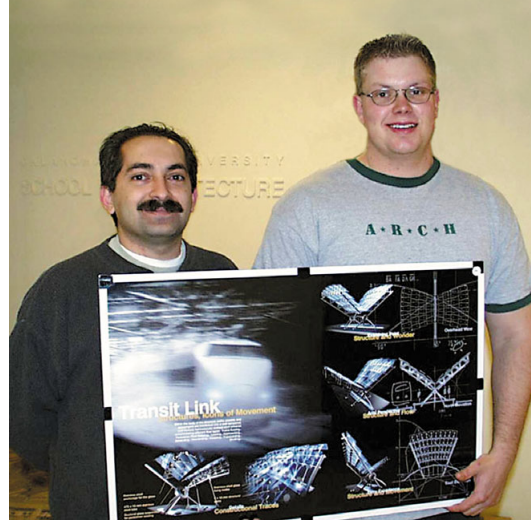
Gammon



Sanchez

CANOE COMPETITION PLACES HIGH

Oklahoma State University students finished second overall in the national finals of the American Society of Civil Engineers (ASCE) Concrete Canoe competition in Golden, Colo. With perhaps the most innovative craft ever built by OSU students in more than 25 years



photo/Adam Huffer

A design initially completed by fourth-year senior **Andrew Klare** (right) for a competition between architecture students at OSU and OU took first place in a national competition. Klare's conceptualization of a futuristic transit stop, that was judged best in The Architectural Partnership's (TAP) intrastate contest in February, received the Award of Excellence in the Annual Design Awards competition sponsored by the New York Council, Society of American Registered Architects (SARA). **Mohammed Bilbeisi** acted as faculty sponsor.

participation in the contest, this year's concrete canoe team recorded the university's highest placing in the competition since it became a nationally organized event in 1988.

This year, 26 teams squared-off in the finals at the Colorado School of Mines. OSU has participated in the competition since the mid-1970s. OSU teams have won the ASCE Mid-Continent Conference regional title and advanced to the national finals in nine of the last 13 years, including a third-place finish last year.

PULLIN' HARD

OSU's American Society of Engineering student branch tractor team captured first place with a 181-foot pull at the Kansas State Fair Exhibition Tractor Pull. OSU team members are **Jake Holloway**, **Stewart Reed**, **Bron Howard**, **Chad Fisher**, **Travis Tsunemori**, **Dustin Simmons**, **Russell Simmons**, **Adam Bohl**, **Jason Walker**, **Justin Elliot**, **Mark Smith**, **Kyle Vandale**, **Shannon Ferrell**, **Duane Needham** and **Andy Holtz**. The team is led by **Bill Barfield**, biosystems and agricultural engineering department head. ▲



Leading the Way



photo/Adam Huffer

(From left) **Kelly Courkamp**, **Cimarron Rasmussen** and **Jill McLaren**, May 2000 industrial engineering and management graduates, were chosen to lead the college's procession to commencement at Lewis Field. Courkamp, carrying the gonfalon, received the Dean's Award this year as the outstanding engineering graduate.

extension & outreach

An R&D Economy Boost

American manufacturers can best ensure their profitability and sustainability by developing new products and processes, according to the National Institute of Science and Technology. For manufacturers, particularly in small- and medium-sized firms with little capital and no in-house R&D staff, it's also the thing they do least.



Hoberock

Larry Hoberock, head of the School of Mechanical and Aerospace Engineering, and Bill Barfield, head of the School of Biosystems and Agricultural Engineering, are leading the establishment of the OSU Engineering Research and Development Center. Like OSU's Applications Engineers program and the Oklahoma Alliance for Manufacturing Excellence's extension agents who provide technology assistance, services offered by the ERDC will be available to firms that have limited resources. The ERDC, however, will fill a completely different void.



Barfield

"Oklahoma has about 6,200 manufacturers, and all but 53 of them are small," Barfield says. "Many of them have ideas for new products that would vault them successfully into a more competitive position, but product and process development requires a research component that is beyond their capabilities.

"The Engineering Research and Development Center will provide a vital link between OSU researchers and our technology infrastructure and Oklahoma manufacturers."

The center complements, and relies upon, the work of the applications engineers and the Alliance's manufacturing extension agents.

"The applications engineers who work for OSU under the subcontract to the Alliance and its manufacturing extension agents will be relied upon to do the initial screening of projects that we will consider," Barfield says. "They have already established a statewide network, and more importantly, a reputation of success, and we will be their primary referral source for research and development for the manufacturers they serve."

By involving a number of entities in feasibility evaluations, including experts from OSU's College of Business Administration and the Oklahoma Technology Commercialization Center, and keeping the turnaround short, the ERDC's planners are reducing the risks typically associated with new product development.

"We are aiming at the new products or processes that generate a million dollars in revenue a year and grow at 20 percent a year over the initial part of the product cycle," Hoberock says. "If the investment in that is \$100,000, which is about what is required for a year and a half of development, the payout in terms of jobs created and new revenue generated for a successful project is 50 to 1.

"When you look at where the opportunity exists to really help the small manufacturers and the statewide economy, it's in the development of new products and processes."

IAS Heats Up

After many attempts to perfect high-performance exhaust systems, lifetime hotrod and racing enthusiast Donnie Duncan decided there had to be a better muffler so he invented it. Now that a manufacturer has taken on his creation, the career machinist stands poised to take much of the hot air out of the muffler market.

The inventor of the first, true-working vortex muffler is one of 500 clients that have contacted the Inventor's Assistance Service since its inception just two years ago. Headed by Dr. Tom Bertenshaw and managed by Jill Nuckolls in OSU's Division of Engineering Technology, the IAS exists to help independent inventors with information, education and referral contacts.

"I heard about the service at an entrepreneurs meeting in Tulsa," Duncan says. "I called them and told them where I was in bringing my muffler to market, and they referred me to the small-business office at OSU-Okmulgee where we put together a business plan."

Yale Industries, a medium-sized firm owned by Buddy Salyer and Troy Lewis, is working to license Duncan's muffler and adopt his business plan.

"We need to prove its performance on the open test market, and that is where we are right now," Salyer says.

"We're also talking with some national parts dealers, and if we can get this deal together, it will be on the market very quickly." ▲

ADAM HUFFER

Calsing and Mihm Win the Day

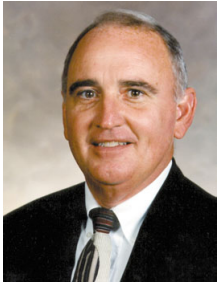
Ronald L. Calsing, president of S&ME Inc. of Raleigh, N.C., and **John C. Mihm**, senior vice president, Phillips Petroleum Company in Bartlesville, were inducted into the CEAT Hall of Fame October 22. They were welcomed into the ranks of 62 previously inducted engineering luminaries during the ceremony acknowledging their achievements.

The drudgery of working in the fields in Grant County, Okla., convinced Calsing that there must be a better way. For him, bachelor's and master's degrees in civil engineering from OSU proved to be the guideposts along the path. The Wakita native began his professional career with Lockwood Greene Engineering in Spartanburg, S.C. After obtaining his professional registration, he was offered a position in 1976 with the then-young firm, Soil and Material Engineers. He was promoted to vice president and was a member of the company's board of directors by the early 1980s. The award-winning geotechnical and environmental engineering and consulting firm, since renamed S&ME Inc., has grown to employ more than 500 people at 13 branches in the Carolinas, Georgia and Tennessee. In 1998, Calsing guided S&ME Inc. through its 25th year with an anniversary theme stressing professional distinction and merit: "A Commitment to Excellence in All that We Do."

Calsing is a registered professional engineer in South Carolina, North Carolina and Georgia. His professional affiliations include the North and South Carolina Society of Professional Engineers, the Association of Soil and Foundation Engineers and Chi Epsilon Honorary Society.

A second generation Phillips employee, Mihm attended Frank Phillips College in Borger, Texas, on a basketball scholarship, and went on to earn his bachelor's degree in chemical engineering at Texas Tech. First assigned to Odessa, his travels with Phillips have included posts throughout Texas, on the company's Ekofisk project in Stavanger, Norway, and settling for now in Bartlesville. His contributions to the company have been in the areas of refining, chemicals, plastics, seismic and information technology. He currently serves as senior vice president of Downstream Technology and Project Development in Bartlesville.

Mihm has received for his service to the engineering profession the American Society of Mechanical Engineers' Distinguished Service Award, the Oklahoma Society of Professional Engineers' Outstanding Engineering in Management Award and distinguished member status in the Society of Petroleum Engineers. A frequent contributor to the development of young engineers through mentoring, Mihm has served on industrial advisory boards to OSU, Texas Tech and the Universities of Georgia, Tulsa and Texas. ▲



Calsing



Mihm

Heller Sails Near the Wind



Heller

For **Charles O. Heller**, life has been and continues to be an adventure.

Heller was named the 2000 recipient of the Melvin R. Lohmann Medal. Since 1991, the medal has been awarded to a CEAT graduate who has made outstanding contributions to his or her profession and/or contributions to the education of engineers, architects or technologists.

Heller was born January 25, 1936, in Prague, Czechoslovakia, as the Nazis were beginning to expand throughout Europe. His parents' property was seized by the invading forces, and he along with his family was forced into hiding. After his father joined the British army and his mother was imprisoned, the family united in 1945 only to have the Communists move in again and seize their property in 1948. They escaped to the U.S. zone of West Germany and then migrated to the United States in 1949.

From Morristown, New Jersey, young Heller joined fellow Czech immigrant Jan Tuma at Oklahoma A&M College after completing high school and played as a walk-on on one of Henry Iba's basketball teams. He and Susan Holsten were married in 1959 while Heller was pursuing a master's degree in civil engineering at OSU.

From Stillwater, Heller worked through a series of positions in the airframe industry and later began teaching in Annapolis, Md. Heller founded a series of companies and brought his entrepreneurial experience to the Dingman Center for Entrepreneurship at the University of Maryland in 1990. He also completed the Ph.D. requirements at Catholic University in 1968.

Heller's honors include Maryland's Entrepreneur of the Year award in 1992, being made an Honorary Member of the Rotary Club in Prague (where the family apartment building is back in the family) and a number of sailing trophies to go with his skiing triumphs! ▲

**“If what you do today is not new, innovative and exciting,
no one will be interested in you tomorrow.”**

World Class Technology

Two important men subscribe to that philosophy:

Albert H. Nelson Jr. and Dr. Ranga Komanduri.

Recently the two joined forces for the benefit of OSU.

Al Nelson knows airplanes.

He can build them, fly them and tell you just about anything you want to know about them. His love of airplanes started at OSU with a degree in mechanical engineering. Influenced by his aeronautics and mechanical engineering professor, Vincent Young, Nelson focused on a successful career that included forming Globe Engineering, a major force in the aerospace industry.

Ranga Komanduri knows materials and advanced manufacturing processes.

He knows his field so well that in 1989 he was given the task of creating a world-class program in advanced manufacturing processes at OSU. Bringing to OSU a strong background in intelligent manufacturing, based on experience in industry, academia and the government, Komanduri has concentrated on niche areas that require serious attention. Dr. Komanduri has developed research facilities for ultraprecision machining and grinding, finishing of advanced ceramics and glasses, modeling of high-speed machining, low-pressure diamond synthesis for coatings on cutting tools and other parts, simulation of metal cutting, and laser-assisted machining.

Komanduri's research in advanced manufacturing processes is a natural fit with the life work of Al Nelson in the field of aircraft and spacecraft parts manufacturing. Reflecting on the impact OSU had on his life and on Komanduri's world class program, Nelson and his wife, Doris, committed to enhance these leading-edge technologies by establishing the Albert H. Nelson Jr. Endowed Chair in Engineering. Ranga Komanduri will hold that position. This gift of \$640,000 will not only enable OSU to work with industry in understanding and solving critical problems, but it will also provide OSU the opportunity to train the best students in advanced manufacturing processes. ▲

For more information about how you can help the College of Engineering, Architecture and Technology, call Marc Thompson, senior director for development, at (405) 744-3734.



KOMANDURI