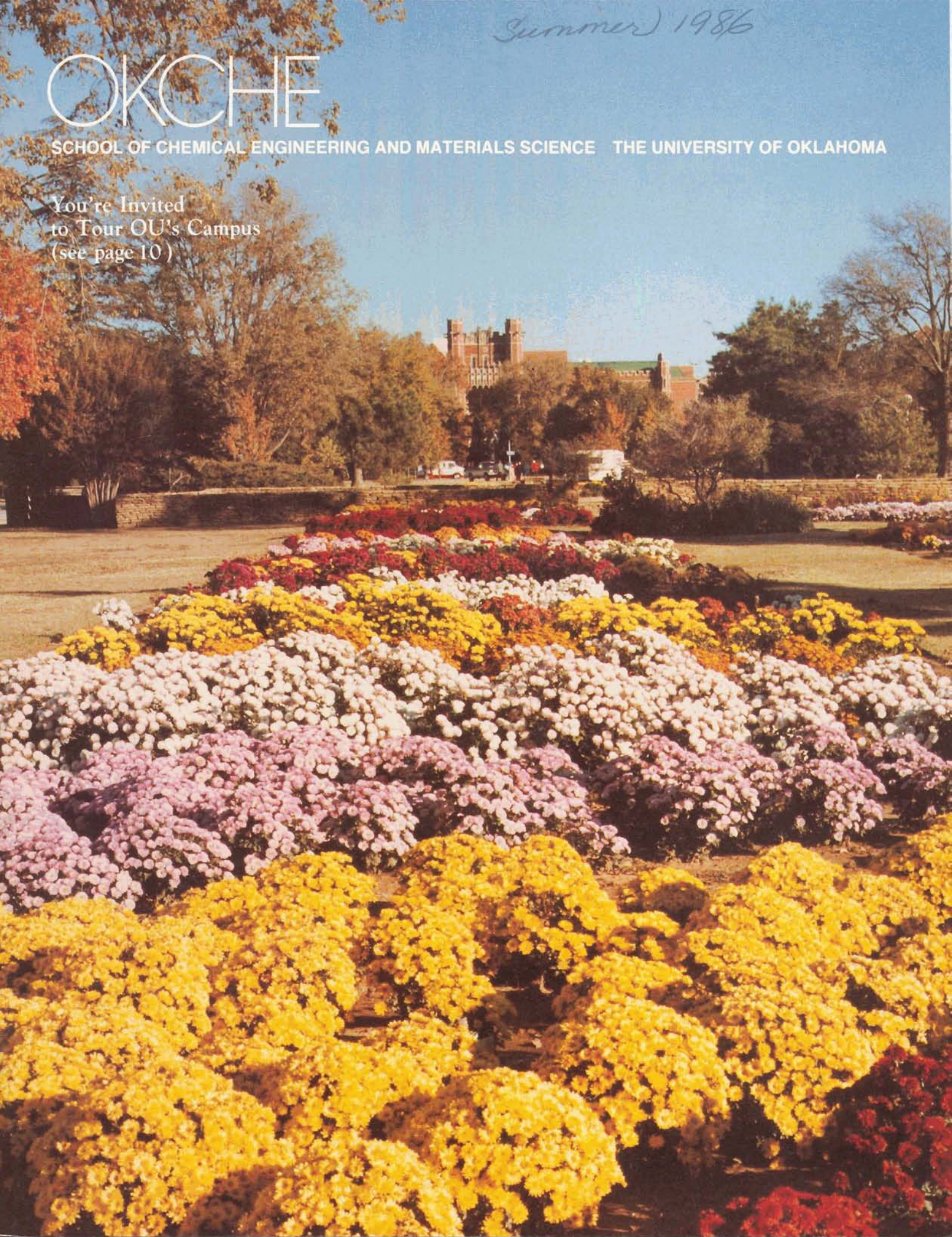


# OKCHE

SCHOOL OF CHEMICAL ENGINEERING AND MATERIALS SCIENCE THE UNIVERSITY OF OKLAHOMA

You're Invited  
to Tour OU's Campus  
(see page 10)

*Summer 1986*





## Contents

Summer 1986

### OkChE Board of Directors

#### Officers

Ed C. Lindenberg . . . . . Chairman  
(918) 744-4770

Robert S. Purgason . . . . . Vice Chairman  
(918) 588-3151

Mary S. Anderson . . . . . Secretary/Treasurer  
(405) 251-2039

#### Directors

Raymond D. Daniels  
(Ex-Officio)

Don W. Green

Verne Griffith, Jr.

James A. Kennelley

Garman O. Kimmell

David P. Kurtz

Charles R. Perry

C. Thomas Sciance

F. Mark Townsend

W. F. Wirges

J. Frank Wolfe

#### Honorary Directors

Richard G. Askew

H. Harold Bible

Zane Q. Johnson

Raymond W. Lowe

William P. Orr

Laurance S. Reid

Bill H. Sellers

### OkChE Magazine

#### Published by

The University of Oklahoma  
School of Chemical Engineering  
and Materials Science  
100 East Boyd, Room F-339  
The Energy Center  
Norman, Oklahoma 73019

OkChE is a production of University Publications. Managing editor, Professor Edgar A. O'Rear; assistant editor, Rick D. Wheeler

This publication, printed by University Printing Services, is issued by the University of Oklahoma and authorized by the director of CEMS. 2,200 copies have been prepared and distributed at no cost to the taxpayers of the state of Oklahoma.

- 2 Notes from the Director
- 2 Locke Departs OU in Decision to Become Dean
- 3 Jischke Becomes Rolla Chancellor
- 4 Love Named Interim Dean of Engineering
- 4 Wadlow Appointed Norman Campus Provost
- 5 Institute for Applied Surfactant Research Founded
- 6 Scamehorn Honored by College of Engineering
- 6 Six at CEMS Receive Faculty Development Awards
- 6 Faculty Update
- 8 Churchill Presents Annual Fair Lecture
- 8 New Degree Options to Be Implemented
- 9 Hankins Awarded Link Fellowship
- 10 You're Invited to Tour OU's Campus
- 14 CEMS Student Awards 1985-86
- 14 Dow Grants CEMS \$3,000
- 15 Alumni Notes
- 15 Perry Honored by University
- 16 OkChE Elects Honorary Board Members

## Notes from the Director

Dr. Raymond D. Daniels assumed duties February 1 as interim director of the OU School of Chemical Engineering and Materials Science, following Dr. Carl Locke's appointment as dean of the University of Kansas College of Engineering.

Daniels has been a professor at the OU College of Engineering since 1958. He served as director from 1963 to 1965 when the college first combined the departments of chemical engineering and metallurgical engineering. He was also interim director of the department from 1970 to 1971.

Daniels received his bachelor's and master's degrees in physics from the Case Institute of Technology in 1950 and 1953, respectively. He earned his doctoral degree in metallurgy from the same school in 1958.

If you don't recognize the fellow in the photograph as the director, that's because it's me, Ray Daniels, and not Carl Locke. This has been a year of changes at OU.

Carl left OU at the end of the spring semester to take on the job of dean of engineering at the University of Kansas. It came as quite a surprise to most of us when, in December, Carl announced that he was accepting the Kansas post. This was a case of the job seeking the man. Carl was very happy here, but he could not turn down the opportunity to apply his administrative talents to a dean's job. We wish him well. He leaves us a strong academic department, rich in young faculty talent that he was instrumental in recruiting.

Another surprise followed soon after Carl's announcement. Dean Martin C. Jischke announced that he had been named chancellor of the University of Missouri at Rolla. Martin left us May 1. Tom J. Love, George Lynn Cross Research Professor of Aerospace, Mechanical and Nuclear Engineering, has been named interim dean. The upward mobility of Carl and Martin reflect the positive contributions each has made at OU.

We will have a new provost on board July 1. Joan Krueger Wadlow is the new provost, succeeding J. R. Morris, who is returning to teaching after more than 25 years in university administration. Provost Wadlow comes to us from the



Raymond D. Daniels

position of vice president for academic affairs at the University of Wyoming.

I was named interim director of the School of Chemical Engineering and Materials Science on February 1. We had planned to initiate a search for a permanent director immediately, but several factors, including the vacancy in the deanship, have caused us to delay initiating a search until this next academic year. This is my third opportunity to serve as director of CEMS, so I am not unfamiliar with the job. My most important task is to maintain the

momentum of our programs and the morale of our faculty in this year of transition.

CEMS faces a difficult period ahead under the influence of a number of factors, both positive and negative. Anticipation is high with the move to the Energy Center and the drive for the Perry Laboratory for gaseous fuels research. The atmosphere in the department is an exciting one with new research programs getting into high gear.

However, the optimism of this highly productive period is diminished by decreasing state support. This comes at a time when faculty salaries are already noncompetitive, and the trend is threatening to CEMS, as our aggressive faculty is increasingly recognized outside the university for their accomplishments and potential. The support of our friends is all the more important at this time. Your contributions are appreciated, and they do make a difference.

In the last issue of *OkChE*, short biographies were given for several CEMS alumni. Your former classmates would like to hear about recent developments in your career and personal life. Use the business reply card in the back of this issue to send us a short note for the next issue of *OkChE*.

Raymond D. Daniels  
Professor and Interim Director



Martin Jischke, former dean of the College of Engineering, will carry with him a memento of all the faculty and staff of the college to his new job as chancellor at Rolla, Missouri. Charles Bert, professor of aerospace, mechanical and nuclear engineering, organized and presented the collection of well-wishers' signatures.

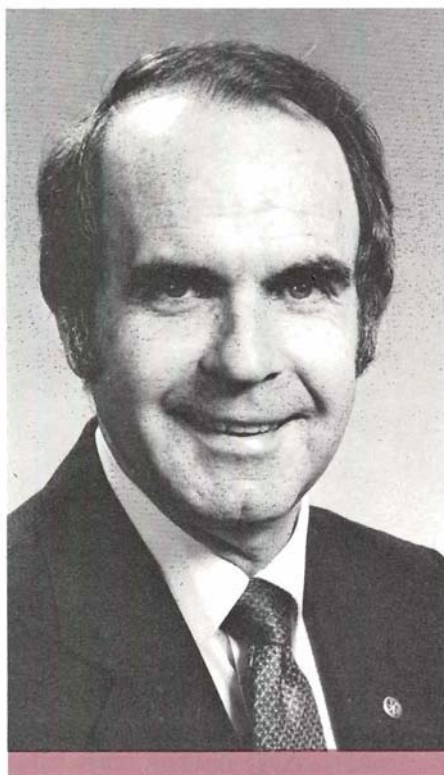
# Locke Departs OU in Decision to Become Dean

Carl Locke, director of OU's School of Chemical Engineering and Materials Science since 1980, has left OU in an administrative career move to become dean of the University of Kansas College of Engineering.

Locke notified the Kansas school's search committee in late November that he would accept the job. Don Green (PhD '63), chairman of the Kansas search committee, said Locke was chosen from a field of 50 candidates. "It was really pretty unanimous that Carl was our first choice," said Green, an OkChE director.

"Carl Locke is a very, very accomplished faculty member, and he's done a remarkable job as director of the School of Chemical Engineering and Materials Science," said Martin Jischke, former dean of the College of Engineering, "We will miss him."

"He has demonstrated as director of the department there that he is really an excellent administrator," Green commented. "The research volume has grown, and he has recruited some good people. We really like what we perceive



Carl Locke

to be his management style." Green noted that Locke had shown outstanding abilities as a researcher in the field of corrosion prevention. He observed that Locke will fit in well with the Kansas school because of the similarity of the engineering program.

"Carl and I have been friends for a long time," Green said. "I learned that he was interested in pursuing a career as dean." Locke and Green have known each other since the early 1960s when both of them were working for Continental Oil Co. of Austin, Texas. It was Green who originally informed Locke of the position's availability.

Locke debated for some time before deciding to accept the position, Green said. "He went through a difficult process. It was a difficult decision for him to leave OU," he said. "OU is losing a very good person, and we're gaining. We're glad to have him," Green said.

Locke joined the OU faculty in 1973 and became director of the School of Chemical Engineering and Materials Science in 1980. Locke had worked for various industrial companies including Continental Oil Co. and Tracor, Inc., before joining the academic community.

Locke was notably effective in recruiting faculty at all ranks, so much so that the school virtually had its choice of all applicants. Other departmental chairmen at OU frequently inquired about the secrets of his success. Beyond recruiting, Locke was instrumental in creating a supportive environment in which new faculty members could develop their teaching skills and research programs. As a result, CEMS research expenditures more than tripled, catapulting CEMS beyond most AAU chemical engineering departments (by this measure).

Despite the heavy administrative demands as director, Locke led the school by continuing to teach and to conduct externally funded research. CEMS faculty note that he was a strong contributor and a good friend.

We wish him the best of luck as he tries to make Kansas the second best college of engineering in the Big Eight!

## Jischke Becomes Rolla Chancellor

This spring, Martin Jischke, former interim OU president and dean of the College of Engineering, accepted the position of chancellor of the University of Missouri at Rolla.

"It was an excellent opportunity for more responsibility and advancement," Jischke said. "They have absolutely superb students, faculty and alumni."

Jischke said his decision to leave OU after 18 years was made many months ago when OU's budget picture looked better than it does now.

Jischke began his duties as chief administrative officer May 1 at the south-central Missouri campus, which is one of four campuses in the University of Missouri system. It is made up of 6,000 students. The university includes a curriculum based on engineering and applied science.

Although Jischke said OU's budget problems were not a factor in his deci-

sion, he did say OU's short-term problems have to be addressed in order to ensure continued progress.

Jischke said OU and higher education in general is pivotal for the future of the state of Oklahoma.

"I'm very proud of the College of Engineering," he said. "Its accomplishments suggest that it is a sound investment to the extent that the resources are available."

Jischke began at OU in 1968 as a professor of aerospace engineering. He then served as director of the School of Aerospace, Mechanical and Nuclear Engineering from 1978 to 1981. In 1981, he was appointed dean of the College of Engineering, which he served as until he became interim president on February 1, 1985. He served in that position until September 11, 1985, when Frank Horton took over as OU's 11th president.

## Love Named Interim Dean of Engineering

Dr. Tom Love, a 30-year member of the OU College of Engineering faculty, assumed duties as interim dean on April 25, following Martin Jischke's resignation to become chancellor of the University of Missouri at Rolla.

"Professor Love is widely known and respected by engineering and industry professionals statewide and has demonstrated a long and enduring commitment and loyalty to the university," said OU President Frank E. Horton. "He brings much experience as an administrator, educator and researcher to the position; thus I feel confident he will provide strong, capable leadership during this interim period."

Love, who earned the title George Lynn Cross research professor in 1973, also holds a Halliburton professorship of engineering and, until 1980, was ad-



Tom Love

junct professor of radiological sciences at the OU Health Sciences Center.

Love, who joined the OU faculty in 1956, is an active member in numerous professional organizations and has received recognition for his teaching and research. His research interests include heat transfer in biosystems, medical thermography, heat transfer, radiative properties and geothermal energy recovery.

During 1984-85, he was chairman of the Norman campus Faculty Senate and as such helped initiate the senate's Speakers Series to make OU faculty available to speak to civic and professional organizations statewide as a way of promoting and explaining the university and its mission.

A nationwide search will begin soon to seek a permanent dean for the College of Engineering.

## Wadlow Appointed Norman Campus Provost

Joan Krueger Wadlow, vice president of the University of Wyoming, was appointed May 8, 1986, to succeed J. R. Morris as the University of Oklahoma Norman campus provost, effective July 1. As Norman provost, Wadlow will be responsible for undergraduate and graduate programs, research, continuing education and public service.

At the time of her OU appointment, Wadlow was the chief academic officer for the University of Wyoming, with direct responsibility over a full-time faculty and staff of more than 1,400, an annual budget of more than \$100 million, seven colleges, and numerous other programs and divisions including student affairs and off-campus programs.

She also has been involved in graduate and undergraduate programs at the University of Nebraska, where she was associate dean of arts and sciences, assistant dean, vice chairman of the political science department and director of



Joan Krueger Wadlow

two interdisciplinary programs. Before assuming her most recent position as vice president, Wadlow was arts and sciences dean at Wyoming for five years.

"This breadth of experience will serve her well as the chief academic officer for the 11 colleges on OU's Norman campus," President Frank Horton said.

Wadlow received her bachelor of arts degree with distinction in political science from the University of Nebraska in 1953 and her master's degree in international relations at the Fletcher School of Law and Diplomacy in 1956. She received a certificate from the Graduate Institute for International Affairs in Geneva, Switzerland, in 1957. She earned a doctorate in political science with emphasis on international relations from Nebraska in 1963.

# Institute for Applied Surfactant Research Founded

Faculty members from the Department of Chemistry have joined forces with faculty in CEMS to create the Institute for Applied Surfactant Research and formalize cooperative efforts that have existed for the past few years.

Ongoing work within the institute is broad in scope and includes research in enhanced oil recovery, perfluorochemical blood substitutes, surfactant-based separation methods, ultrathin films and fundamental properties of surfactant systems.

Founding members of the Institute are Jeffrey H. Harwell, Edgar A. O'Rear and John F. Scamehorn of CEMS and Sherril D. Christian and Bing M. Fung of the OU Department of Chemistry. Christian is director of the institute.

Harwell and Scamehorn are focusing surfactant flooding research on the development of surfactant formulations that could be effective in high salinity/hardness reservoirs, involving studies of surfactant adsorption, precipitation, microemulsion formation and chromatographic separation of surfactants in reservoirs, and with emphasis on the nonideal behavior of surfactant mixtures.

A major project of the institute is the investigation of both thermodynamic and kinetic effects to prove the viability of a new process that utilizes surfactant precipitation/coacervate formation to improve sweep efficiency in reservoirs.

O'Rear and Fung are studying ways to improve perfluorochemical (PFC) blood substitutes. Their work includes the synthesis and *in vitro* testing of new nonionic fluorocarbon surfactants to extend the physical stability of the PFC emulsions and prolong the lifetime of the blood substitute in circulation. These surfactants may eliminate some side effects observed with the surfactant currently used.

Institute members are exploiting a wide variety of surfactant phenomena to develop useful separation methods. One process, micellar-enhanced ultrafiltration, can be used to remove dissolved organics or heavy metals from water. It relies on the solubilization of the organics in micelles or the binding of the



*The broad scope of applications of surfactant science in diverse areas of high technology brings together more than 30 graduate and post-doctoral student research assistants involved in research under the direction of the five founding members of the institute.*

metals on micelles, combined with an ultrafiltration step, to effect the separation.

Another technique, admicellar chromatography, involves the adsorption of surfactant on hydrophilic supports, with the subsequent adsolubilization or removal of organics from aqueous streams that are passed through the adsorption column. Other work, surfactant-enhanced carbon regeneration, involves passing a concentrated surfactant solution through spent activated carbon beds to regenerate them by utilizing solubilization in the surfactant micelles.

Modifications of these processes are being developed and may make possible the industrial scale resolution of enantiomers. Practical application of such separation processes to such mirror-image isomers would, for instance, make possible less expensive pharmaceutical products.

Harwell and Scamehorn are currently editing a book entitled *Surfactant-Based Separation Processes* to be published as part of the Surfactant Science Series.

A new process invented by Harwell and O'Rear for formation of ultra-thin polymer films uses adsorbed surfactant bilayers to position monomers next to

solid surfaces. This *in situ* polymerization results in ultra-thin polymer films with possible applications of commercial importance, such as chromatography packings, corrosion barriers, drag reduction films, stabilization of colloidal suspensions and photoresists.

All of the members of the institute are involved in various phases of basic research on surfactant systems. Fundamental studies are being conducted to further the understanding of surfactant science as well as to benefit the areas of application being developed.

Institute members have observed many similarities in the properties of aqueous surfactant micelles, adsorbed surfactant bilayers on solids, surfactant monolayers at fluid/fluid interfaces and other extended structures such as vesicles.

A wide range of physical methods is being used to study colloidal systems, including measurement of vapor pressure, surface tension, conductance, dialysis, ultrafiltration, phase equilibrium, adsorption, ellipsometry, surfactant precipitation and electrochemical properties. Theoretical models and computer simulations of surfactant aggregates are being used to clarify mechanisms of adsorption, micelle formation, solubilization and adsolubilization.

## Scamehorn Honored by College of Engineering

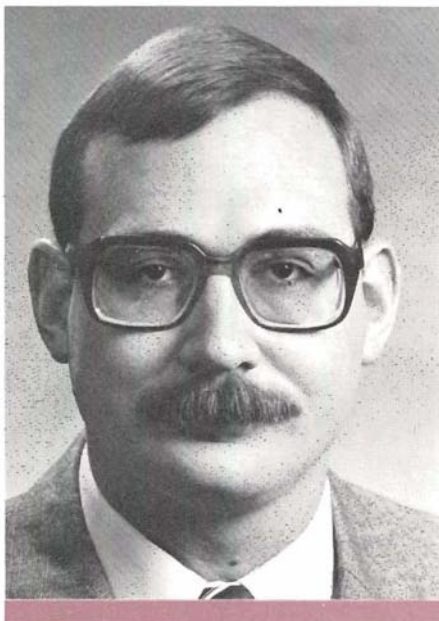
Professor John F. Scamehorn received the 1986 College of Engineering Award for Outstanding Faculty Achievement in Research at the 73rd annual College of Engineering banquet in March, a remarkable accomplishment for such a young faculty member, in recognition of his efforts in the application of surfactants to enhanced oil recovery and new separation methods.

Former Dean Martin Jischke noted during the presentation that Scamehorn is an aggressive researcher. Since joining the faculty in CEMS in 1981, he has been involved in research grants exceeding \$800,000 from the National Science Foundation, the Petroleum Research Fund, the Department of Energy and the Department of Defense. Scamehorn has published more than 20 technical papers and has 10 patents in his name.

"John is both highly gifted intellectually and exceptionally well organized," a faculty colleague commented. "This is a formidable combination, and when coupled with good taste in research, which John certainly has, it makes him one of the most valuable faculty members in the entire university."

Scamehorn's primary research interests are the application of surfactants to enhanced oil recovery and in the development of new separation methods. In less than five years, Scamehorn has become a recognized expert in the surfactant area and a leading authority on mixed surfactant systems. He has authored more than 25 presentations at national meetings and has organized and chaired symposia for the Colloid and Surface Science division of the American Chemical Society and for the Colloid Committee of the American Institute of Chemical Engineers. In addition, he is in the process of editing and co-authoring two books, one of which is in the prestigious Surfactant Science Series.

Scamehorn's research accomplishments have not come at the sacrifice of his teaching, but by long dedicated



John F. Scamehorn

hours. His many responsibilities include administration of OkChE scholarship funds through his directorship of the Program of Excellence. Through the program, he is able to help recruit and advise many of CEMS's most successful students.

## Six at CEMS Receive Faculty Development Awards

Six CEMS faculty members received \$2,000 Young Faculty Development Awards in November 1985. The six who have been named recipients of these Associates Distinguished Lectureships are Professors Rex Ellington, Jeffrey Harwell, Richard Mallinson, Edgar O'Rear, John Scamehorn and Robert Shambaugh.

In the OU College of Engineering, funds made available for Associates Distinguished Lectureships are designated as Young Faculty Development Awards to recognize excellence and potential among junior faculty in the college.

## Faculty Update

Professor Rex T. Ellington received U.S. Patent Number 4,552,409 for his process "In Situ Oil Shale Retort with Controlled Permeability for Uniform Flow." Ellington presented the paper "High-Quality Compressibility Factors Prove Accuracy of New Correlation" at the 65th annual GPA convention held in March in San Antonio, Texas. The paper was coauthored by Professor Ken Starling, Jeff Savage (PhD '85), post-doctoral research associate, and Mark J. Hill (MSChE '85).

Professor Jeffrey H. Harwell presented three papers at the national American Chemical Society meeting in New York in April. He presented two more papers at the 60th annual Colloid and Surface Science Symposium convening in Atlanta, Georgia, in June. Graduate student Nick Hankins (BSCHE Cambridge '84) received a \$20,000 Link Foundation Fellowship for energy research for 1986-87 for a proposal based on a new enhanced oil recovery process invented by Harwell with Scamehorn.

Professor Lloyd L. Lee attended the annual AIChE meeting in November 1985 and presented a paper, "The Interaction Site Model of Group Contributions."

Professor Richard G. Mallinson's research efforts are beginning to come to fruition in his third year at OU with the beginning of his project with Ken Starling sponsored by the Department of Energy to study the calorimetric properties of coal fluids. The project complements Starling's other multiproperty correlation work on coal fluids. Mallinson's OU sponsored research in emulsion polymerization was summarized in a paper presented in June by his doctoral student Chan Hong Lee at the 60th Colloid and Surface Science Symposium in Atlanta, Georgia. A follow-up paper will be presented at the annual AIChE meeting in Miami Beach in November. This work has been greatly aided by the acquisition of a laser light scattering system, made possible with financial assistance by Coulter Instruments, and by a gel permeation chromatograph purchased with the as-

sistance of the OU Associates and Energy Resources Institute. These instruments are greatly enhancing many faculty members' research in polymeric materials.

Professor Edgar A. O'Rear presented a paper on "Polymerization of Styrene Inside a Physically Adsorbed Surfactant Bilayer" at the spring national meeting of the American Chemical Society. In February, he attended the Organic Thin Films Gordon Conference held in Santa Barbara, California. O'Rear's graduate research assistant Jeng Yue Wu presented a paper in a related area of styrene polymerization at the penta-sectional meeting of the American Chemical Society. O'Rear is continuing his research on the flow properties of red blood cells and the physical properties of perfluorochemical blood substitutes, research supported by grants from pharmaceutical companies and the National Institute of Health. Implications of the research may aid sufferers of diabetes or hemolytic anemias such as sickle cell anemia, as well as patients using prosthetic heart valves and dialysis and heart-lung machines.

Professor John F. Scamehorn received the OU College of Engineering Annual Research Award for 1986 for his contributions to surfactant science. Scamehorn edited and contributed to *Phenomena in Mixed Surfactant Systems*, the latest addition to the American Chemical Society Symposium Series, just off the press. The volume is based on a symposium sponsored by the Division of Colloid and Surface Chemistry at the 59th Colloid Symposium and the 5th International Conference on Surface and Colloid Science held in June 1985. The book demonstrates the wide range of phenomena in which surfactant mixtures are important and describes current thought and techniques for modeling surfactant interaction, including discussions of micelle formation, surfactant adsorption on solids, surfactant adsorption at fluid-fluid interfaces, solubilization, liquid crystal formation and emulsification. Scamehorn's recently published papers include "Surfactant Precipitation in Aqueous Solutions Containing Mixtures of Anionic and Nonionic Surfactants" in the *Journal of American Oil Chemists' Society*,

coauthored by Kevin L. Stellner, CEMS doctoral candidate; "Phase Equilibrium in Aqueous Mixtures of Nonionic and Anionic Surfactants Above the Cloud Point" in *Colloid and Polymer Science*, coauthored by CEMS alumnus Odie E. Yoesting (MSChE '85); and "Use of Micellar-Enhanced Ultrafiltration to Remove Dissolved Organics from Aqueous Streams" in *Separation Science and Technology*, coauthored by Robert O. Dunn, Jr., a doctoral candidate, and Professor Sherril D. Christian, OU Department of Chemistry.

Professor Robert L. Shambaugh and his graduate students have completed a fully instrumented melt blowing device that will be used to produce high-strength, microdenier fibers. The device, which required a year and a half to construct, utilizes a process in which a near-supersonic gas stream impinges upon molten polymer to produce the fibers. Shambaugh and his students will be using ultra-high-speed microphotography (involving 0.5 microsecond light bursts) to observe and measure the 500 m/sec filaments as they are being formed. The information gained from this work will enhance scientists' understanding of how processing affects polymer microstructure (crystallinity, etc.) and macroscopic properties (tenacity, modulus, etc.).

Professor Cheddy Sliepcevich presented "Oversights in Energy Reference States" at the Oklahoma Academy of Science 74th annual meeting (Nov. 1985) in Shawnee, Oklahoma. He published "Convenient Formulations for Convection/Diffusion Transport" with Professor Faruk Civan, OU School of Petroleum and Geological Engineering, in *Chemical Engineering Science*; "Application of Differential Quadrature to Solution of Pool Boiling in Cavities," also with Civan, in *Proceedings of the Oklahoma Academy of Science*; and "Solving Integro-Differential Equations by the Quadrature Method" in *Proceedings of the First International Conference on Global Techniques, Integral Methods in Science and Engineering*, held at the University of Texas, Arlington, March 1985.

Professor Sam S. Sofer received a small grant from the OU Faculty Research Council to build two new multi-



Professor Ken Starling organized the 61st meeting of the International School of Hydrocarbon Measurement (ISHM). J. R. Mosteller, president of Oklahoma Natural Gas Co. (center), delivered the keynote address. Ron Grimes (right) served as 1986 chairman of the General Committee of ISHM. The weeklong session of short courses and exhibits provided the latest in gas measurement technology and theory to more than 1,500 conference goers.

## Churchill Presents Annual Fair Lecture

Dr. Stuart W. Churchill, a specialist in convection and combustion, presented the 12th annual Harry G. Fair Memorial Lecture of the OU School of Chemical Engineering and Materials Science on April 23 on the topic "Radiantly Stabilized Combustion: The True Story of a Research Program."

The presentation to an audience of about 140 students and faculty detailed the accumulated results of 20 years of modelling and experimentation on a process of flame stabilization designed to produce an exceptionally clean flame. Churchill described the path of the research as "serendipitous."

Churchill, an Imlay City, Michigan, native, received bachelor's degrees in both engineering mathematics and chemical engineering from the University of Michigan in 1942. After a few years of working in industry at Shell Oil Company and Frontier Chemical Company, Churchill completed graduate work in chemical engineering at the University of Michigan, receiving his M.S.E. in 1948 and Ph.D. in 1952.

Churchill was appointed instructor in 1950 at his alma mater and rose to professor in 1957. He served as chairman of the Department of Chemical and Metallurgical Engineering from 1962 to 1967. In 1967, he joined the University of Pennsylvania as the Carl V.S. Patterson Professor of Chemical Engineering.



Stuart W. Churchill

Churchill has been active in professional society activities, serving as director of the American Institute of Chemical Engineers from 1961 to 1967 and as vice president in 1965 and president in 1966. He is a member of the Combustion Institute and the American Chemical Society.

His research, teaching and consultation have encompassed chemical kinetics, mass transfer and fluid mechanics, but have focused primarily on natural convection and combustion.

Churchill's research and publications have been recognized by the Professional Progress Award in 1964 and

the William H. Walker Award in 1969 of the AIChE, by the Max Jakob Memorial Award in Heat Transfer of the ASME and AIChE in 1979 and by a citation from the Air Force Aeronautical Systems Division in 1961. In 1976 he received the S. Reid Warren, Jr., Award of the University of Pennsylvania for Distinguished Teaching and in 1978 the Warren K. Lewis Award of the AIChE for his contributions to chemical engineering education. He has been elected to Tau Beta Pi, Phi Kappa Phi, Phi Lambda Upsilon and Sigma Xi. In 1971 he was named a fellow of the AIChE and in 1980 received their Founders Award. In 1974 he was elected a member of the National Academy of Engineering and in 1983 a corresponding member of the Verein Deutscher Ingenieure. In 1978 he was awarded a grant from the Japan Society for the Promotion of Science to carry out research on solar heating at Okayama University, Japan.

## New Degree Options to Be Implemented

The School of Chemical Engineering and Materials Science is considering several new options for its undergraduate degree program in accordance with the recommendations of the report "Chemical Engineering Education for the Future" and those of the OkChE Board.

New programs of study will be modelled after the highly successful pre-medical elective pattern, the optional program of elective courses within the chemical engineering curriculum that adds emphasis on the biological sciences. CEMS graduates of the chemical engineering premed option curriculum have enjoyed a very high acceptance rate into medical school.

Proposed options include specialization in biotechnology, polymer science, materials science, and management and systems engineering. In general, the new curricula will restrict the choice of elective courses but will not add to the course credit hours required for graduation.

## Faculty Update continued

stage blood cell separation heads for a centrifuge. Sofer is attempting to isolate white blood cell subpopulations for the synthesis of pharmaceuticals and for extracorporeal removal of diseased subpopulations. The new heads will allow blood cell separations of higher efficiency and resolution. Sofer and alumni Carl Camp and Ema Ogoro presented a seminar at the OU Health Sciences Center on the topic of processing of blood and the potential use of fluidized-bed bioreactors with white cells. Sofer recently spoke in Norman with Irving Middle School students about engineering careers.

Professor Ken Starling, with Mary Ann Holmes, arranged the 61st meeting of the International School of Hydrocarbon Measurement (ISHM), the oldest and largest school of its type in the world. More than 1,500 registrants attended more than 100 classes and viewed more than 100 exhibits of equipment related to gas and liquid flow measurement and control May 20-22. J. R. Mosteller, president of Oklahoma Natural Gas, delivered the keynote address. Starling is participating in discussion with ONG personnel about the possibility of a cooperative OU/ONG proposal to the Gas Research Institute for the development of a natural gas metering research facility.

# Hankins Awarded Link Fellowship

CEMS graduate student Nicholas P. Hankins has been awarded a fellowship and research award of \$20,000 from the Link Foundation in a national competition. The title of his winning project is "Enhanced Oil Recovery by Surfactant Enhanced Volumetric Sweep Efficiency."

The Derbyshire, Great Britain, native joined CEMS last fall after completing his studies at Cambridge University. Nick will spend his fellowship under the guidance of his thesis advisor, CEMS Professor Jeffrey H. Harwell.

Nick traveled to the Link Foundation Energy Conference on June 20 in Rochester, New York, to receive his award. The period of the fellowship is from July 1, 1986, through June 30, 1987.

At the end of his fellowship year, Nick must prepare a report to present at a meeting in Rochester in June 1987.

Key to his decision to pursue a doctorate at OU, Nick said, was CEMS's willingness to involve a first-year student in research and to work out a package of financial support. The prospects of obtaining an opportunity to do research in Great Britain, he said, are

very dim. Nick commented that other American universities he had considered, including M.I.T. and major California universities, were unwilling to involve a foreign student in research during his first year.

Nick said areas of ongoing research at OU that appealed to him as he made a decision to attend OU were CEMS's work in biorheology, pollution control and enhanced oil recovery. "I am interested in a career in research, particularly in petroleum-related industries," Nick said.

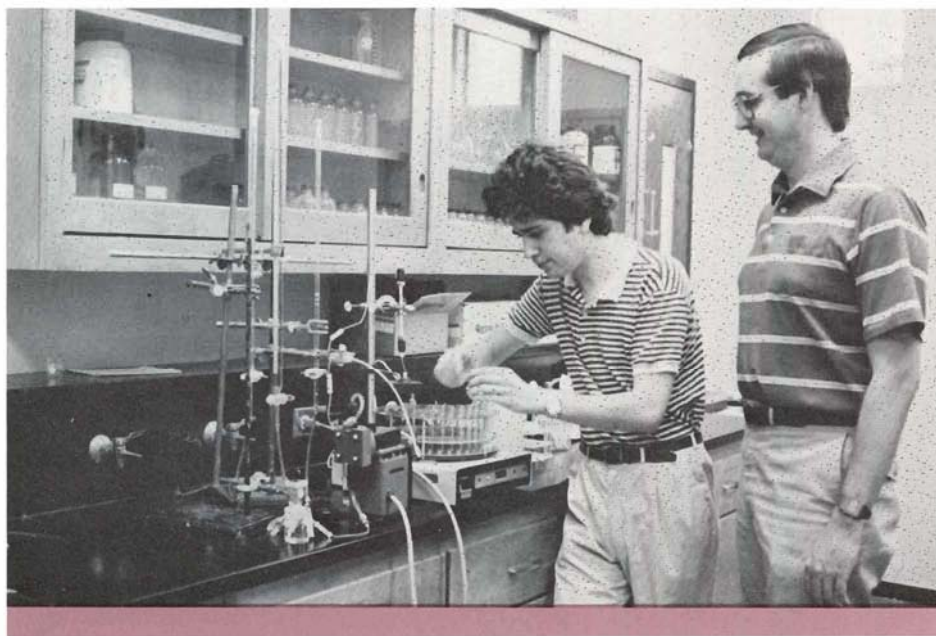
Acknowledging stiff competition for severely depressed opportunities for such work in Great Britain, Nick said he may seek work and practical industrial experience in this country, thereby providing an edge on competition for later employment in his home country. Nick's field experience in his own country includes work as a process engineer based in Aberdeen, Scotland, completing line-sizing calculations for an onshore crude oil stabilization and desulfurization plant, and critical evaluation of fire-fighting equipment on offshore oil platforms.

Nick has served as a CEMS teaching

assistant for a senior-level course in chemical engineering kinetics and reactor design as well as assisted in research on enhanced oil recovery.

The Link Foundation Energy Fellowship Program, administered by the University of Rochester, was designed to foster energy research and to distribute the results of that research through lectures, seminars and publications.

The Link Foundation, established in 1953 by Mr. and Mrs. Edwin A. Link, makes grants to qualified non-profit organizations interested in the mastery of the air and sea and in the development and conservation of energy resources.



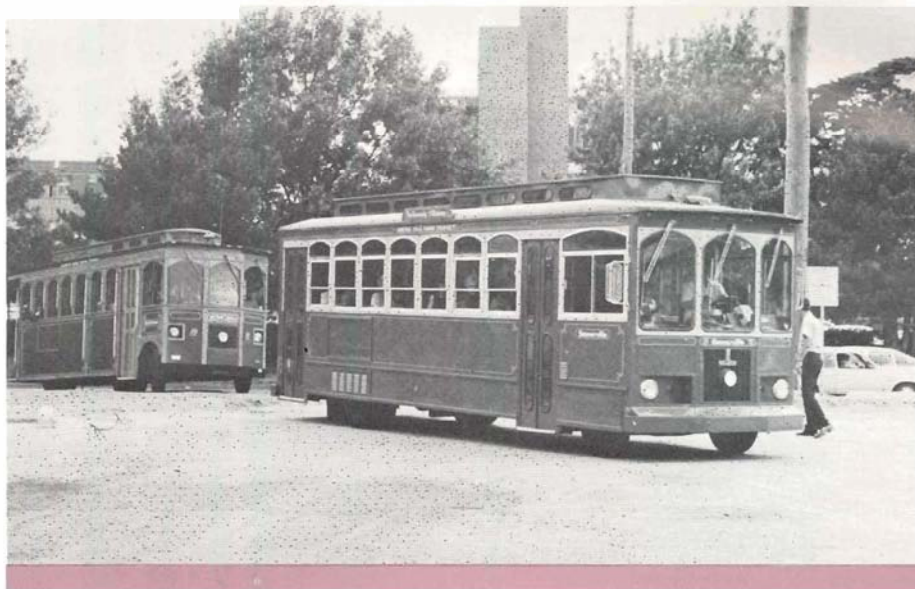
Link Fellowship winner Nick Hankins, graduate student, and his thesis advisor Professor Jeffrey Harwell discuss progress on his research project on surfactant enhanced oil recovery.



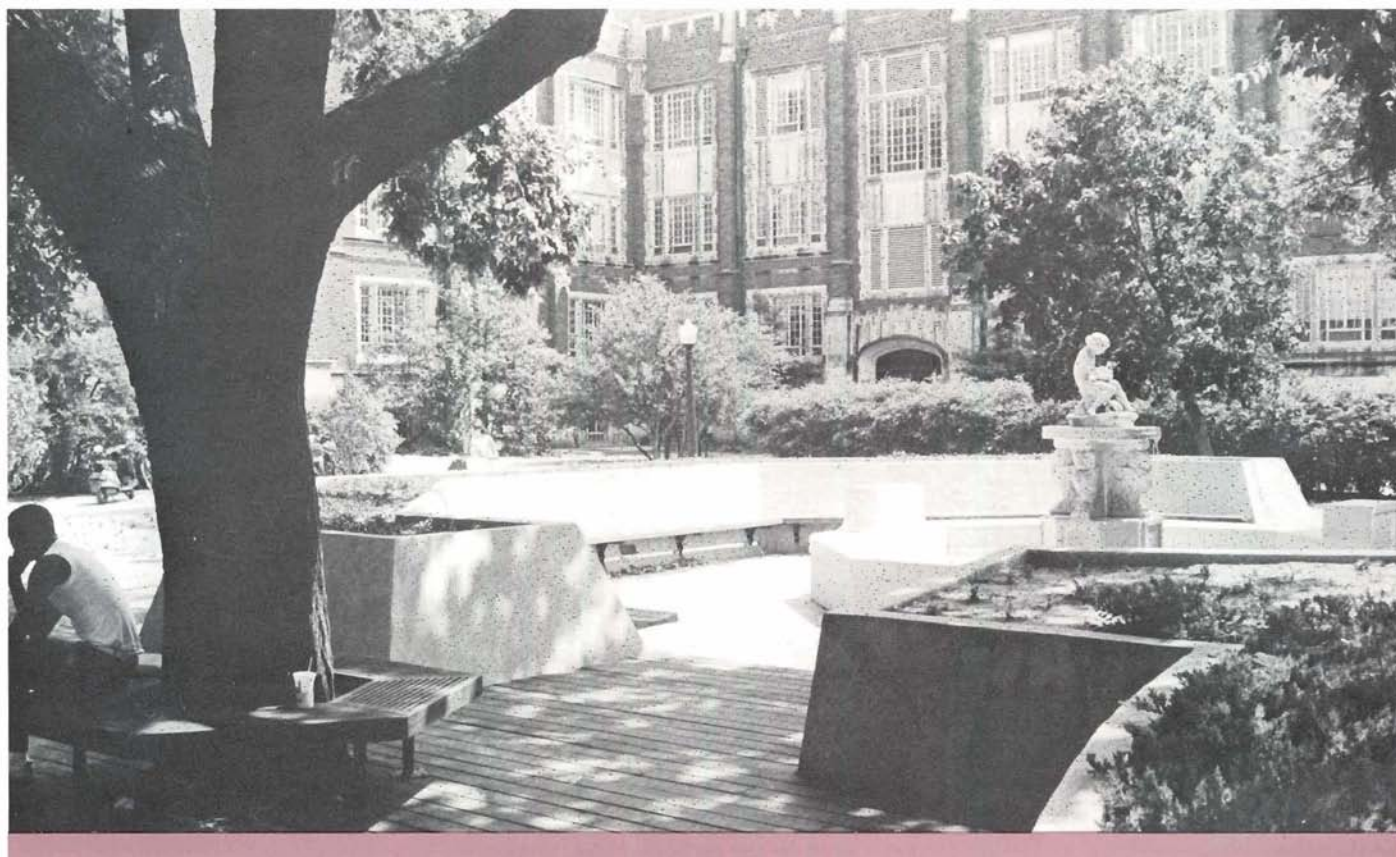
First-year graduate student Steve Outlaw (BSCHE '85) examines a capillary rheometer constructed at OU for the solid state coextrusion of polyolefins, a project for which he was awarded a \$10,000 Associates Graduate Student Fellowship for 1985-86. Steve's research on coextrusion with thermotropic liquid crystal polymers, with supervising Professor Bob Shambaugh, will serve as a background for an anticipated career in process design in the plastics industry.

## You're Invited to Tour OU's Campus

Many of our CEMS alums stop by to visit often, and others leave Norman never to return. The "photo tour" that appears on the following pages is intended to brag a little about the capital improvements the Norman campus has experienced in the last several years and to prepare you for what you will see when you do come to pay us a visit. (You'll be surprised if it has been very long since you were here!)



*Step aboard CART, Campus Area Rapid Transit, for your leisure tour of campus. CART provides easy access to the major areas of the Norman campus and many of the surrounding areas of Norman. Watch that first step!*



*OU campus courts and lawns provide many new benches for both sun and shade. A favorite of many students, the Patricio Gimeno memorial fountain between Adams and Buchanan halls provides a restful spot for a moment's reflection, study or the feeding of local birds and squirrels.*



One of the Norman campus's newest buildings, the School of Music Catlett Center, provides needed practice and performance facilities in a structure that makes the most of natural light with skylights and expansive windows.

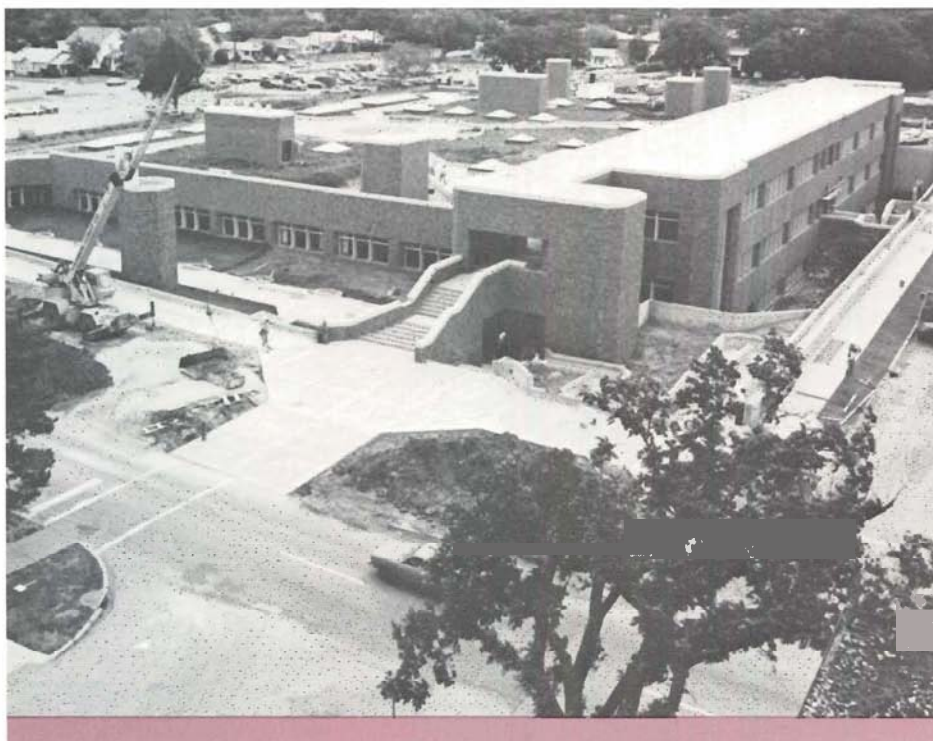
The Doris W. Neustadt wing of Bizzell Memorial Library greatly expanded library facilities at OU, which recently acquired its landmark 2 millionth volume. The contemporary addition, which features a clock tower, blends well with the original Gothic structure situated in an impressive open plaza facing Elm Street.



The OU Duck Pond reopened after a year of renovation provided by volunteer labor and donated equipment and materials to celebrate its 50th anniversary in August 1985. Community effort restored the popular Norman campus park to its original beauty and commemorated the effort with a new fountain.



Another new addition to south campus, the OU Foundation building provides an inviting setting for the management of the university's programs of private funding that ensure excellence in many academic areas.



Almost one-half of the 350,000-square-foot OU Energy Center was ready for occupancy in mid-summer 1986. The next issue of OkChE will feature CEMS's new home, located in the Energy Center.

## Our Commitment to Excellence

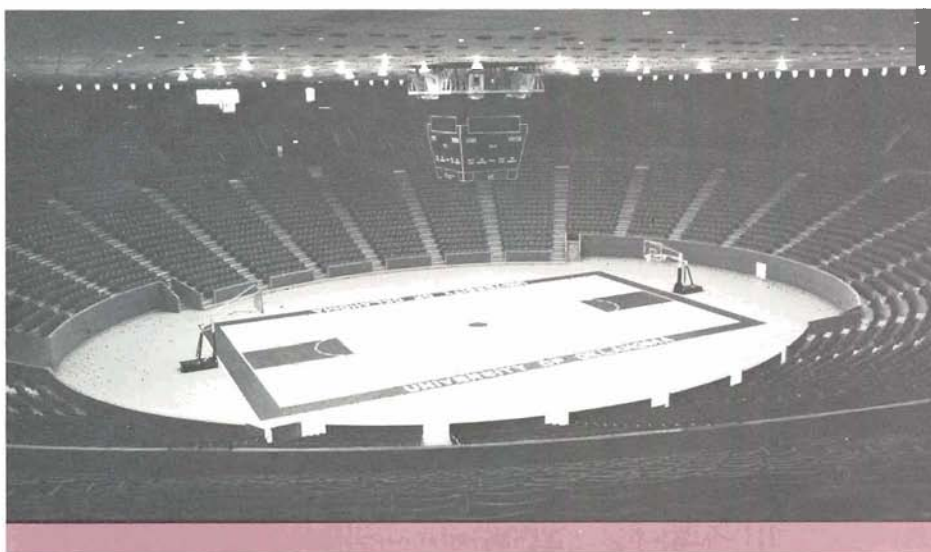
The University of Oklahoma extends beyond the Norman campus to Oklahoma City (the Health Sciences Center); Tulsa (Medical College); Canon City, Colorado (Geological Field Camp); and the Hacienda in Colima, Mexico, among other locations. But we are especially proud of the Norman campus planning, construction and landscaping that began in the Banowsky era and are continuing today under the leadership of President Frank Horton. The new buildings across campus are tangible monuments to more extensive changes that help to fulfill CEMS and OU's commitment to excellence.

Of the new facilities, the OU Energy Center most directly affects CEMS. The first phases of the \$45 million building are ready for occupancy as of mid-summer 1986. And future phases of the center are in the planning stage.



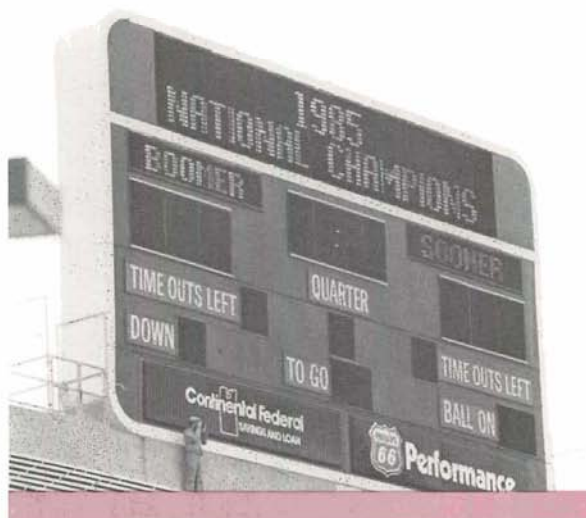
The OU College of Law relocated to spacious new south campus facilities on Timberdell Road.

*OU students enjoy a long-awaited health and recreation facility, the Huston Huffman Center for physical fitness.*



*Lloyd Noble Center provides indoor facilities for OU's home basketball games, shows, concerts and other large events. The center features computerized ticket sales and expansive parking as well as easy access from Highway 9.*

*No caption needed . . .*



## CEMS Student Awards 1985-86

Seven students in the OU School of Chemical Engineering and Materials Science recently were honored for their outstanding scholastic and research work.

The \$200 Phillips Award for Outstanding Senior was presented to Richard Krenek II. Ngoc-Chau Thi Thai received the Pamela Pesek Johnson Award for Process Design, a \$200 award, while Lori Walker Brant collected a \$100 award from the American Institute of Chemists. The winner of the \$200 Robert Vaughan Award For Excellence in Undergraduate Research for 1985-86 was senior John Barton.

Two awards were made to Brad Harris—the \$1,000 Dow Chemical Company Outstanding Junior Award and the \$100 American Institute of Chemical Engineers Award.

Marilyn Grass received the \$200 CEMS Outstanding Sophomore Award. Marilyn also received the \$1,000 Society of Women Engineers United Technologies Scholarship for 1985-86. This Bethany sophomore is the recipient of a \$1,000 Standard Oil of California American Indian Science and Engineering Society Scholarship. The Standard Oil award was presented to her earlier at the AISES national convention in Minneapolis, Minn.

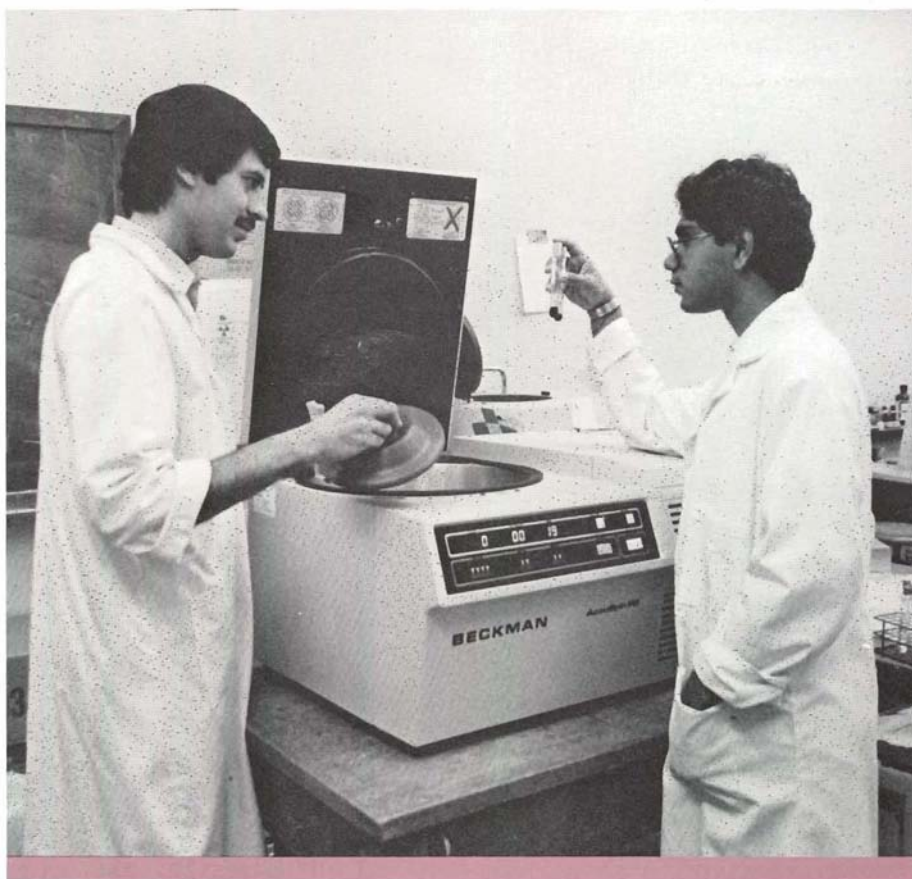
## Dow Grants CEMS \$3,000

CEMS received one of two \$3,000 gifts presented to the University of Oklahoma by the Dow Chemical Co. Foundation of Midland, Michigan. The other unrestricted grant was awarded to the Department of Chemistry.

Presenting the gifts on behalf of the Dow Chemical Foundation was L. J. Burmeier, manager for training and development for Dow Chemical U.S.A. in Freeport, Texas. Checks were presented in November 1985 to Carl Locke, then director of CEMS, and Glenn Dryhurst, chairman of the OU Department of Chemistry.



*CEMS student award winners for 1985-86 are, from left, John Barton, Brad Harris, Lori Walker Brant, Marilyn Grass and Richard Krenek II.*



*Graduate students Vinod Tuliani and Vankat Puranpanda prepare blood samples for separation into blood cells and plasma in a new high-speed digital centrifuge being used in biomedical research supervised by Professor Ed O'Rear. The centrifuge is equipped with a refrigeration unit for differential separation of blood and plasma.*

## Alumni Notes

**Phillip D. Applegate** (BSChE '83) has moved to Hobbs, New Mexico. He is employed as a plant engineer at Warren Petroleum's Monument facility.

**Kevin M. Goin** (BSChE '73), who is employed by IBM as an advisory marketing support representative at Gaithersburg, Maryland, writes that he is a member of the API subcommittee on liquid hydrocarbon compressibility writing standards 11.2.2, 11.2.1 and 11.2.3.

**Steve Graves** (BSChE '81) graduated from the OU medical school in June 1985 and is currently training for ophthalmology at the Dean A. McGee Eye Institute, where he is employed as a resident physician.

**Gordon J. Leaman, Jr.**, (BSChE '73) was recognized for outstanding individual performance by the Oklahoma Society of Professional Engineers at the joint OSPE-KES annual meeting in May. Leaman is senior process engineer for Conoco, Inc., in Ponca City, currently designing refinery processes.

**Earl E. Patterson** (BSChE '44, MSChE '47) wrote to offer a copy of Perry's *Chemical Engineer's Handbook* in response to a recent CEMS request for editions. His second impression of the second edition was purchased for him in 1943 by the OU chapter of Alpha Chi Sigma to honor him as "Outstanding Freshman Chemistry Student of 1941-42." "The binding is a little dogeared," he commented. "This copy has been through quite a bit. Upon graduation from OU in 1944, it accompanied me to Navy midshipman school at Cornell University; to Diesel School at North Carolina State College; to several mine sweepers in the Pacific in Guam, Japan, China and the Philippines; then back to OU for a master's degree in 1946-47; on to MIT for a doctorate; to duPont for four years in titanium metal R & D; and then to Reynolds Metals for the balance of my professional career. Considering all that, it is in pretty good shape," he commented. "I have not found any of that free time that retired people are supposed to have," the Richmond, Virginia, resident noted about early retirement from Reynolds Metals Co. in 1982.

**Marc T. Payne** (BSChE '78) was promoted in January at Monsanto Chemicals Co. to the position of international MTS manager of elastomeric alloys at their Akron, Ohio, plant.

**Louis A. Pebworth** (BSChE '50) has taken a long-term assignment as technical services manager for the National Fertilizer Co. of Nigeria for Kellogg Plant Services. He and his family have relocated to Port Harcourt, Nigeria.

**Charles T. (Tom) Perry** (BSChE '84), son of alumnus **Charles R. Perry** (BSChE '51), received his second OU degree, completing a master's of business administration this May. Tom and his wife, Ruth, are moving from Norman to Texas to work more closely with the family business, managing Betona Aviation, an aircraft charter and leasing company that is part of Perry Management, Inc. Tom and Ruth are anticipating the arrival of their first child in mid-August.

**Tracy Snyder Walder** (BSChE '78, MSChE '80) visited CEMS in February. She is employed by the General Electric Medical Systems Group at Pleasanton, California.

**John H. Waller** (BSChE '61) has purchased Toefco Engineering, Inc., which was one of the original duPont Teflon industrial applicators, and turned the failing custom coating company around financially. The company applies a wide array of high-tech and decorative electrostatic spray powder coatings. Job orders range from single, maintenance parts to tens of thousands of automotive parts per day, involving everything from intravenous catheters to fuel tanks for rockets, including coating the bolts used to reconstruct the Statue of Liberty. "While I have previously managed a number of business turn-arounds," Waller said, "this is the first time I've played the game on my own. Even though the prospect of debtor's prison or retiring to a life of subsisting on cat food is on the line every day, I'd say this is less stressful than trying to guess what the boss will expect of me tomorrow." Waller conferred with fellow alum **Tom Science** (PhD '66) and said, "Tom gave just the right amount of advice. If we ultimately fail, it will all be his fault. If we ultimately succeed, it will be Tom Who?"

## Perry Honored by University

**Charles R. Perry** (BSChE '51) received a Distinguished Service Citation during OU commencement ceremonies May 10, alongside baseball player Johnny Bench, opera singer Leona Mitchell, OU professor and administrator J. R. Morris, and U.S. Secretary of the Interior for Indian Affairs Ross Swimmer.

Perry, who holds 12 patents, was honored for his contributions to the natural gas industry during his career.

Perry has served as Gas Processors Association national vice president and is a member of the American Institute of Chemical Engineers. The Odessa, Texas, resident is active in numerous community activities. In 1984, Perry established a \$500,000 challenge grant from the Perry Foundation to fund the Perry Laboratory for Gaseous Fuels Research at OU.



Charles R. Perry

# OkChE Elects Honorary Board Members

At the recent spring meeting of the OkChE Board of Directors, the bylaws of OkChE were amended to establish a new category of board membership. These new board members will be called honorary members of the board. Election to honorary membership is to be reserved in recognition of those individuals who have over time distinguished themselves by their service to OkChE. Individuals considered for honorary membership must be nominated by the OkChE Nominating Committee and confirmed by the entire Board of Directors. Honorary members will serve for life unless the term of service is later changed.

The board received nominations for an initial group of honorary members, and the individuals awarded honorary membership at the spring meeting were the following: Dick Askew, Harold Bible, Zane Johnson, Raymond Lowe, Bill Orr, Bud Reid and Bill Sellers. Their names appear on the inside cover of this issue of *OkChE* along with other officers and members of the board.

We would be remiss if we did not take this opportunity to recognize three individuals who would certainly be among those elected to honorary membership if they were alive today—Harry Fair, Bill Hewitt and Bob Vaughan.

