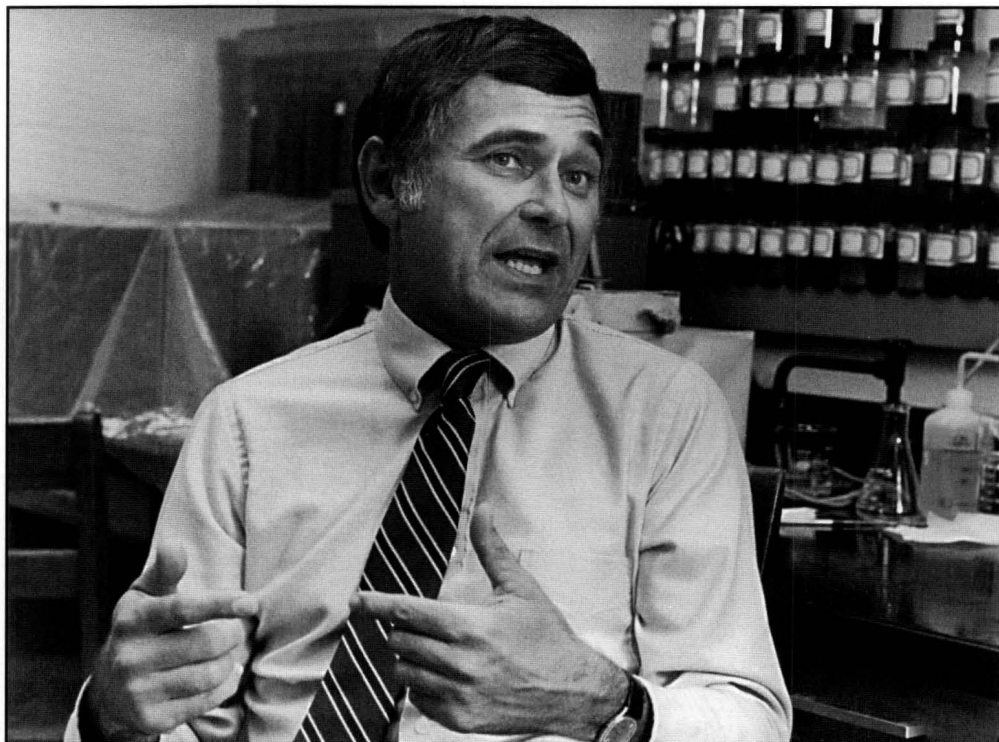


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Don Green

of the
University
of Kansas

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When Don Green entered graduate school in the late 1950s, he didn't know that he would emerge with a lifelong friendship and professional relationship that would affect how chemical engineers the world over do their jobs. *Perry's Chemical Engineers' Handbook*—relied on by practicing engineers and engineering students alike—has a history few people know. Fewer still understand the role Don Green has had in continuing the Perry family legacy.

"I was Bob Perry's first PhD student when he was a chemical engineering faculty member at the University of Oklahoma," recalls Green, who is the Deane E. Ackers Distinguished Professor of chemical and petroleum engineering at The University of Kansas. "John Perry [Bob's father] edited the first three editions, and Bob assumed editorship after his father's death in 1953. While at OU, Bob edited the fourth edition of the handbook, and I assisted him in various ways, including working on the kinetics section."

The Green and Perry families continued their friendship after both men left OU. In 1977, Perry was consulting and living in London while continuing his work with the hand-

book, and he pressed Green into service again.

"Bob invited me to be a section editor on the sixth edition and had a plan that I would join him as coeditor for the seventh edition, targeted for publication about ten years after the sixth," Green said. "Bob had two sons, neither of whom had careers related to engineering. He had inherited the book from his father, and I think he wanted to pass the leadership along to a person who was close to him and almost like family."

Green accepted the invitation, but before the two friends were able to do much work, Bob Perry was killed instantly in a tragic car accident in London while crossing the street on foot. Perry's widow, Gail, and publisher of the handbook, McGraw-Hill Book Co., asked Green to assume the editorship of the sixth edition, and he accepted. Green engaged James O. Maloney, KU emeritus professor of chemical and petroleum engineering and former department chairman of 19 years, to support the project as assistant editor. The sixth edition sold approximately 190,000 copies and is probably more widely distributed across the world than any other chemical engineering book.

► ***“Don [comes] across as a caring and thoughtful person, one who [embodies] the philosophy that the university experience can transform the lives of students. . . . [He] is an excellent role model for other faculty in that he does everything so well: teaching, scholarship, leadership, and service. And he excels in all of these areas while maintaining a calm, cool demeanor.” ◀***

Today, *Perry’s Chemical Engineers’ Handbook* is in its seventh edition, with Don Green as editor and J.O. Maloney as associate editor. Published in 1997, it has sold approximately 37,500 copies in its first two years and was recognized by the Library Division of the American Society for Engineering Education as the Best Reference Book of 1998.

Bob Perry’s decision to pass his father’s legacy on to Green was well-founded. Don Green is an inspired educator and esteemed research engineer who holds genuine concern for the success and happiness of his students and colleagues. He is a well-known researcher in oil reservoir technology, a Fellow in the American Institute of Chemical Engineers, and an ABET accreditation visitor for the Society of Petroleum Engineers (SPE). He is a Distinguished Member of the SPE, a reviewer of technical articles for the SPE Journal, and has been an SPE Distinguished Lecturer. Green is chairman of his department at KU and past chair of the Association of Petroleum Engineering Heads. He is a sports enthusiast and a faculty athletic representative to the Big XII Conference and the National Collegiate Athletic Association. But his role of pro-

fessor as teacher is the role Green loves best. During a 35-year teaching career, he has inspired countless students with his enthusiasm, dedication, judgment, and good nature.

“Don made his class subject matter interesting and enjoyable,” says former student Bill Weisenborn, now with Conoco, Inc. “He could explain all topics in such a way that we wanted to continue to learn and improve ourselves.”

Carlos Rocha, former graduate student and now a project manager with Jacobs Engineering in Hamilton, Ohio, finds that he still calls upon advice gained in Green’s classes. “Don Green provided me with an example of how a person should behave in our competing and demanding society,” Rocha says. “As a project manager for a very large engineering consulting firm, sometimes I get caught on decisions that I think are overwhelming. How can I make the right decision—do the right thing? I go back to what I learned from Don: If I am not uncomfortable telling my family the decision I made and its potential consequences, then I made the best decision I could. He taught me ethics as an engineer and as a human being.”

EARLY, EASY DECISIONS

Green was born and raised in Tulsa, Oklahoma, when the city bore the nickname of “Oil Capital of the World.” Oil derricks and office buildings of the world’s largest petroleum companies neighbored the American Legion ball fields that Green played on as a boy. In a community with an industry based in petroleum, Green never questioned having a career in oil. He decided during high school to become a petroleum engineer.

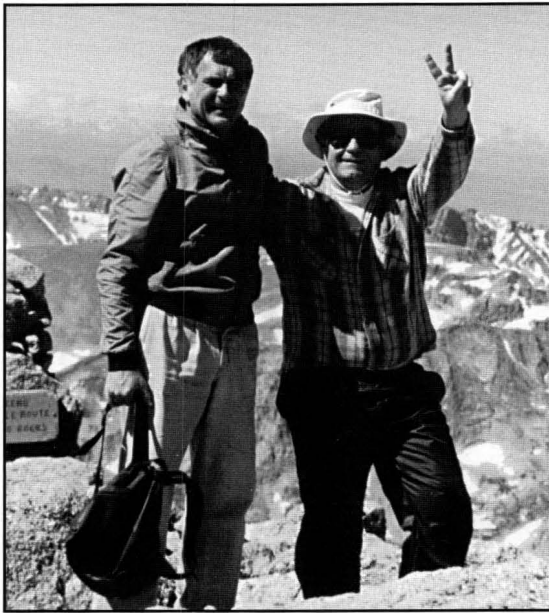
Green spent his freshman year at Oklahoma State University before transferring to the University of Tulsa. His love for baseball won him the varsity team’s third-base position for two years, and he was selected as second-team All-American. In 1954, Green and Patricia Polston, who was studying nursing, were married. The next year, Green graduated with a BS in petroleum engineering and went to work as an engineer trainee for Gulf Oil Co., in Tulsa.

Having participated in an Air Force ROTC program as an undergraduate, Green was called into active duty after five months at Gulf Oil. Point of duty: Suffolk County AFB, Long Island, New York.

“Being a Midwesterner, the East Coast was the last place in the world I wanted to be stationed,” Green says, “but it turned out to be a great location and assignment.”

Green was made petroleum supply officer for the base, a position of responsibility that honed his management skills and gave him the maturity to think clearly about the future. He settled on returning to school for graduate study in chemical engineering, and in 1958 he and Pat traveled back to Oklahoma. Green entered the master’s program at the University of Oklahoma under Professor Richard Huntington. He continued at OU as a doctoral student under Professor Perry.

Still pursuing his interest in petroleum engineering, Green chose heat transfer in porous media as his doctoral research topic. He considers his excellent experience as a doctoral student to have been a strong influence on his decision to become a professor. Mentors that influenced



◀ *Don (left) and his brother-in-law Bob Willett at the top of Long's Peak in Rocky Mountain National Park, Colorado, after scaling the 14,256-ft. mountain. (Photo courtesy of Don Green, 1994)*

▼ *C.S. Howat, III (left) congratulates Don on receiving the 1987 HOPE Award while chancellor Gene Budig (right) looks on. Howat and Green are both on the faculty of the KU Chemical and Petroleum Engineering Department. (Photo by R. Steve Dick, 1987)*



him most were Perry, Cedomir Sliepcievich, and Jack Powers.

Green finished his doctorate in 1962 and joined Continental Oil Company. As a research engineer in the company's Petroleum Production Research Division in Ponca City, Oklahoma, Green worked with computer simulations of oil reservoirs. Although the research was challenging, Green's graduate school experience remained in his thoughts.

"The lifestyle the professors were leading seemed exciting to me," Green says. "I liked the idea of being in a university setting where teaching, research, and scholarship activities were combined."

After two years in industry, Green made the move to being a chemical and petroleum engineering educator when he was hired by KU in 1964 as an assistant professor. Because the chemical and petroleum engineering department at KU offered undergraduate and graduate degrees in both areas, Green and the job were a perfect fit. He was promoted to associate professor in 1967 and to full professor in 1971. He was named the Conger-Gabel Distinguished Professor in 1982, an award that requires a demonstrated record of sustained excellence in undergraduate education in addition to excellence in research and professional service. And in 1995, Green was honored with the Deane E. Ackers Distinguished Professorship, a post he still holds.

He is in his second term as department chairman and has won teaching awards on the average of one every other year. With his KU colleague Paul Willhite, Green is co-director of a program in oil reservoir technology that is recognized as a model for technology transfer.

AN EXEMPLARY TECHNOLOGY TRANSFER PROGRAM

From its location in the state's eastern corner, The University of Kansas has long been considered by state residents, whether for better or worse, as a liberal institution. The political atmosphere of the Vietnam era only added to that reputation. While student demonstrations at KU did not escalate to the levels of violence at other universities across the country, KU's image statewide was somewhat tarnished.

In 1973, then-Chancellor Archie Dykes pushed the university to develop interactive programs with the state. Green and Willhite took a close look at Kansas oil producers, who at the time were between a rock and a hard place: The country was enduring an energy crunch, yet within Kansas bedrock lay inaccessible oil resources. The producers, who were mostly small, independent operators without engineering staffs or direct access to research facilities, found themselves unable to use the enhanced oil recovery technology being developed primarily by major oil companies. Green and Willhite responded with a concept for a program that would help the state's independent oil producers take advantage of technology research that no single producer could afford to fund.

The Tertiary Oil Recovery Project (TORP) received state funding in 1974, with Green and Willhite as co-directors. It has been funded every year since and last fiscal year received more than \$790,000 in research support from the State of Kansas. Since 1979, the U.S. Department of Energy has provided more than \$8.5 million in support of research and technology transfer. Major companies such as AMOCO, Phillips Petroleum, and Marathon Oil have also been supporters. The project's objectives are to conduct research related to enhanced oil recovery processes, to provide technical assistance

to industry, and to educate students and operators in tertiary oil recovery and reservoir management. TORP is tied closely to the CPE department and to the KU School of Engineering. Over the years, about 90 graduate students have conducted research through TORP leading to their PhD or MS degree. The project has also provided research opportunities for undergraduate students.

Green and Willhite have published numerous articles and reports related to oil recovery, and they are frequent presenters at technical meetings. In 1998, they published *Enhanced Oil Recovery* through the Society of Petroleum Engineers. The book is a comprehensive text of advanced oil-recovery processes and is applicable for use in senior or graduate courses in petroleum engineering.

Over the years, TORP researchers have explored thermal recovery processes, micellar-polymer flooding, carbon dioxide miscible displacement, reservoir computer simulation, and in situ permeability modification using gelled polymer systems.

A major, current emphasis is development of gelled polymer technology, which aims to improve volumetric sweep efficiency in oil-recovery displacement processes such as waterflooding. In such a displacement process, the injected fluid often flows between the injection wells to production wells in a "short circuit" because of high permeability zones or fractures in the reservoir. As a result, most of the oil is bypassed and not contacted by the injected fluid, resulting in poor displacement efficiency. Additionally, the injected fluid must be recirculated or disposed of, which can be costly. Gelled polymer technology involves injecting a gel system into the "thief" zone where it reacts to form a gel and thereby seals off the zone. Fluid subsequently injected will be forced into other parts of the reservoir, thereby improving efficiency.

TORP researchers also are working on implementing a field trial to recover oil from Kansas reservoirs through applications of supercritical carbon dioxide. They believe the process, which has been used successfully in west Texas, has the potential to revitalize the Kansas oil industry. To gain an understanding of the potential impact the field trial may have, approximately 10 billion barrels of unrecovered oil are estimated to lie within Kansas' borders.

The success of TORP at transferring viable technologies into the private sector has gained the program recognition by the Independent Petroleum Association of America and by the Department of Energy. Because TORP was an early

participant in technology transfer and because the project has been so effective in fulfilling its objectives, the Department of Energy used TORP as a model when it increased funding of tech-transfer programs across the country in 1994.

MAKING A STRONG DEPARTMENT STRONGER

TORP is one of several research programs that involve KU's chemical and petroleum engineering students. The department has had a rotating chair since 1964, and since then Green has held the post twice, including his current appointment. Green credits Willhite, the department's previous chair, with building a well-rounded faculty and with strengthening the research programs. Both are areas Green continues to emphasize.

"I strongly feel that what is right for our program is a balance between teaching and research that gives each a comparable weighting," Green says. "I think that one of my primary roles as chair is to support the faculty in every appropriate and feasible way. This means providing the resources needed for teaching, assisting in the development of research programs, and working to see that they are recognized for accomplishments."

The result is a cohesive department with a diverse faculty, strong undergraduate and graduate programs, and well-endowed scholarships that attract some of the brightest students entering the university. A recent review of the university by the Kansas Board of Regents provided data showing that the average ACT score of freshmen entering the CPE program was the highest of any program at KU.

Compared with their peers nationally, KU's CPE students remain strong. In the last fifteen years, KU students have won more awards in the National Student Design Competition sponsored by the AIChE than any institution in the country. The record is due in large part to Sharp Teaching Professor Colin S. Howat III, who teaches chemical engineering design, as well as to the outstanding quality of the student body.

Student achievements in the last two years have brought the department further national recognition. In 1998, three chemical engineering students were awarded Barry S. Goldwater scholarships for outstanding academic achievement and research. The honor, considered the premier award of its type, is given annually to undergraduates who excel in engineering, natural sciences, or mathematics. An institution may nominate only four students. Interestingly, that year a

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KU physics student also won a Goldwater Scholarship, so the university as a whole was batting four for four.

One of the chemical engineering recipients, Larissa Lee, went on to win a Churchill Foundation Scholarship to study in England. Lee pursued the department's pre-medical option, one of three program options that Green and CPE faculty developed to enable undergraduate students to tailor their studies according to their plans for graduate school or industry. The options are pre-medical, bio-medical, and environmental.

The program options, combined with strong scholarships, have attracted greater numbers of women students to the CPE program. In the 1997-98 school year, nearly 46% of undergraduate degrees in chemical engineering at KU were awarded to women. The average throughout the School of Engineering, which has ten undergraduate engineering programs, was 19.2%. Nationally, the figure for women earning undergraduate degrees in engineering was 18.7% according to the American Association of Engineering Societies, Inc.

As chair, Green has worked to maintain excellence in teaching and research innovations by building faculty strength. The department recently hired three new faculty, two of whom are women, to make a total of thirteen members. Bala Subramaniam, Conger-Gabel Distinguished Professor and assistant department chair, notes that Green is the type of leader who considers all viewpoints, yet arrives at decisions without delay. "Don's impressive record of accomplishments in education, research, and service enables him to command the respect and trust of his faculty as chair," Subramaniam says. "I've found Don to be a very open-minded leader, and he has a knack for developing consensus."

Marylee Southard, an alumna of the chemical engineering program and now an associate professor, says Green encourages everyone to go as far as possible to reach their own potential. "He is the ultimate cheerleader," she says, offering as example Green's support when both educators were in contention for a university-wide teaching award. "We stood out on the football field at halftime on a typical sunny, chilly November day, waiting for the winner to be announced. Don commented to me that he hoped I'd win it; that he'd already won this once before, and I deserved it. When it happened, I believed him."

Subramaniam echoes Southard's observations. "Don believes that an important role of a chair is to facilitate the professional development of every faculty member. He does this fairly and effectively. I have been most impressed by his genuine concern to see every one of his faculty succeed and be suitably rewarded for their efforts."

Southard considers Green's most significant achievement to be a consistency of excellence that affects how he mentors both students and faculty. "He has lived what he advises us 'young Turks' to do," Southard says. "Don is committed to

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doing the best at all facets of his job. He is tireless in his work and completely prepared for meetings and classes every day."

TREATING STUDENTS AS JUNIOR COLLEAGUES

Subramaniam says that whether Green is teaching an introductory class to freshmen or a graduate-level special-topic seminar, he prepares his lecture with the audience in mind and delivers the lecture with the same enthusiasm and clarity. "This is just a reflection of Don's positive attitude toward, and respect for, students at all stages," Subramaniam says. "He treats them all alike—as junior colleagues, as he likes to say."

Tom Edgar, chaired professor of chemical engineering at the University of Texas, says his interaction with Don Green while a student at KU in the late 1960s was a major factor in his decision to become an educator. "Don came across as a caring and thoughtful person, one who embodied the philosophy that the university experience can transform the lives of students," Edgar says. "Don is an excellent role model for other faculty in that he does everything so well: teaching, scholarship, leadership, and service. And he excels in all of these areas while maintaining a calm, cool demeanor."

"Those of us who go through cycles of burnout and high energy wish there were a pill that could give us his drive," Southard says. But the answer to Green's energy lies with his mentor, Bob Perry. Green says, "Bob used to tell me, when things were not going all that well because of administrative or bureaucratic problems, 'Thank God for the students. It's because of the students that we're here.' That quote accurately reflects my feelings."

His sense of humor no doubt has helped Green keep his energy level high, particularly when he uses it in classroom settings to ease tension and let students know that he, too, is human. Rocha remembers Green as capable of taking jokes and handling unforeseen situations well. "In one of his courses, he gave us (the students) the wrong data to use in a computer problem. He showed up in the classroom with a sign hanging from his neck that read 'Stupid.'" Rocha continues, "He taught me that we all make mistakes, even a professor, and that it makes the situation much better for everybody if the mistake is acknowledged and everyone moves forward together."

Over the years, Green has won numerous teaching awards, but the award of which he is most proud is the university-

wide Honor to Outstanding Progressive Educator, or HOPE, award. The award selection is made annually by members of the senior class.

Green was the initial sponsor of the precursor to the KU student chapter of the Society of Women Engineers, and he has involved himself in other campus programs related to students and teaching. In the 1970s, Green and his colleague, Floyd Preston, worked with a group of African American students to develop a program to recruit, support, and mentor undergraduates. Preston and Green were the first sponsors of the group, and over the years it has evolved into a well-established program that incorporates four minority engineering groups. It now has a full-time adviser and serves approximately eighty students at any one time.

Green also has been involved with the KU Athletic Department, serving two terms on the athletic board. In 1996, Chancellor Robert Hemenway invited Green to serve as the university's Faculty Athletic Representative to the Big XII Conference and the NCAA. In the post, Green deals with legislative issues such as academic requirements, rule-waiver requests, eligibility concerns, and budgets.

Several years ago Don took part in a university-wide discussion of teaching. The result was a committee that focused on ways of improving teaching and undergraduate education. Green chaired the committee for several years, during which it looked at issues such as colleague-to-colleague mentoring, improving classroom physical facilities, augmenting audio-visual equipment in classrooms, holding teaching colloquia, and initiating teaching awards. The committee evolved into the Center for Teaching Excellence at KU and now has its own facility and dedicated staff.

AWAY FROM THE CLASSROOM

Don Green may not allow his competitiveness to come through when teaching, but he is only holding it in check. An avid handball player since his days in graduate school, he rarely lets anything interfere with his games and often plays three times a week with a small group of friends.

"We feel about handball as does Sarge of the 'Beetle Bailey' comic strip," Green says. "According to Sarge, handball is the only real court game and racquetball is for wimps. At least, that's the kidding I give to our students, who tend to play racquetball."

Green and his three sons, all KU graduates, are enthusiastic about KU sports, especially KU basketball. Guy, the oldest son, is an environmental engineer with the U.S. Corps

of Engineers, Michael is Assistant U.S. Attorney in the Western District of Missouri, where he prosecutes drug cases, and Patrick is a medical doctor and cardiologist in Ft. Collins, Colorado. Pat and Don are blessed with two grandchildren, ages seven and four, who were born to Guy and his wife, Aina.

When his sons were young, Green served as Little League coach, and the family often went camping and hiking together, something they still enjoy. The family shares a vacation home near Estes

Park, Colorado. Green has climbed Long's Peak, in Rocky Mountain National Park, three times—twice with Pat. The mountain, known as a "fourteener" by climbers, has an elevation of 14,256 feet and an elevation gain of 4,850 feet. Green plans to go to the top again soon. "When you're hiking, you're challenging yourself and you get to see beautiful country," he says. "Being outdoors is wonderful, and there's nothing like being in the mountains."

The drive to challenge oneself and others from a point of respect while at the same time enjoying life is a gift Don shares with those around him. Marylee Southard, who first met Don in 1972 when she was a senior in high school, characterizes him best. "Don said he has no recollection of any childhood pivotal point or transforming cataclysm that suddenly gave him drive and optimism," she says. "I believe these traits are an inborn part of Don Green. He is a Midwesterner with a decent work ethic and a love for his students and for working with them. We who have been mentored by Don are his legacy, and we hope that his attitude and energy have become part of us as we talk and work with him." □



(Left to Right) Don, his daughter-in-law Aina, his son Guy holding granddaughter Erika, his wife Pat, his son Patrick, and his son Michael.