ChE educator

Richard M. Felder

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RICH FELDER JOINED the Department of Chemical Engineering at North Carolina State University in July 1969. He holds the rank of Professor and has established himself as a leader in chemical engineering education. His contributions in teaching, research and administration reflect commitment to the profession and engender appreciation and admiration from his colleagues.

TEACHING

RICH TEACHES UNDERGRADUATE courses in Reaction Kinetics and Reactor Design, Thermodynamics, Chemical Process Systems and Chemical Process Principles, which is the first course in chemical engineering. In addition he teaches graduate courses in Chemical Kinetics, Reactor Design, Optimization, Process Modeling and Special Topics in Coal Gasification.

His ability to establish rapport with students makes him one of the most popular faculty members in the Department. Undergraduate and graduate students have consistently evaluated his courses as being among the best they have taken. In recognition of his teaching performance he has received a School of Engineering Outstanding Teacher Award and has been named to the NCSU Academy of Outstanding Teachers.

Students particularly compliment the clarity with which Rich can present a lecture. Course evaluation forms describe him as "always prepared," "clear and easy to follow" and a "great teacher." More than any other faculty member, he is responsible for glowing compliments consistently used by students to describe the introductory course in chemical engineering. The demanding nature of this course makes such attitudes remarkable.

Rich has a classroom style centered about what might be called a present-and-probe approach. The "present" part always consists of a routine in which the class is told first what is going to be covered and why it is important. The concept is subsequently presented clearly and concisely and, finally, an example is used to illustrate its application to a practical problem. The "probe" part actually occurs during his presentation; he sprinkles an oversupply of "okay"? and other rhetorical questions throughout the lecture, somehow sensing which points have been grasped by students and which need additional coverage.

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His work with students outside the classroom is also exemplary, both in his official capacity as Graduate Administrator and in his unofficial role of confidant and consultant. His concern for the development of the complete person fosters statements on student evaluations like "he is always willing to discuss a problem, even if it is a personal one."

In recent years Rich has given numerous industrial short courses in Basic Principles of Chemical Engineering, Process Maximization, Polymer Reactor Technology and Separation Process Technology. In participant critiques of these courses he draws raves for his clarity, style and quantity of material covered.

Finally, no description of Rich's teaching would be complete without mentioning his work with countless elementary and junior high school students. It is not unusual to see him charging out of his class on chemical kinetics and into a meeting with a third grade class from one of Raleigh's magnet schools for extraordinarily gifted and talented kids. He will have volunteered to discuss something like coal gasification with these children, and will do so with the same clarity and enthusiasm he has for his senior class in reactor design. It is believed that he could, given a little notice, walk into a class on almost any subject and present a lecture that would result in students learning the material he presented.

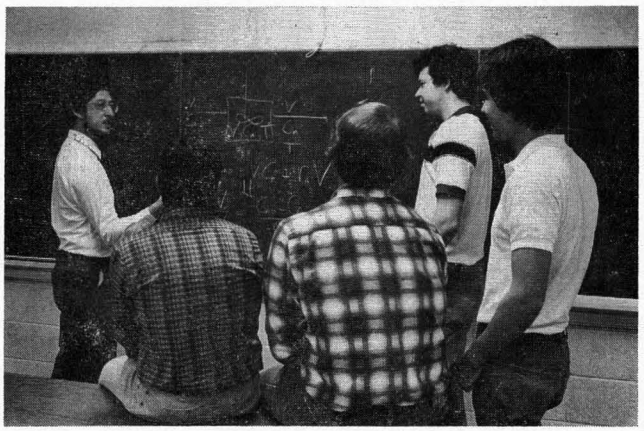
ADMINISTRATOR

As Graduate Administrator, Rich coordinates all graduate student activities in the Department, including applications for admission, admission of new students, selection of a research advisor and graduate committee, selection of a minor, administration of the Ph.D. qualifying examination and scheduling of final oral examinations. Graduate students recognize him as their most important contact, outside of their thesis supervisor, during their stay at North Carolina State University. The reorganization of the Ph.D. qualifying exam is one of Rich's most significant administrative accomplishments. It has been given in its present format for almost 10 years without significant complaint.

RESEARCHER

Rich's research is based on his interests in modeling chemical processes and the effects of chemical processing on the environment. These broad concerns have led to a variety of research programs, including radioisotope applications to process analysis, photochemical reactions, use of polymeric interfaces for stack sampling, modeling of electrostatic precipitators and, most recently, environmental effects associated with coal gasification. He has published forty-five articles in refereed journals as a result of research in these fields and he was recently awarded a patent for the novel use of polymeric interfaces in stack gas monitoring.

The Environmental Protection Agency supports his research on the development of a collection tube for use as an interface in stack sampling, modeling the performance of electrostatic precipitators and the environmental effects of coal gasification. His research on the evaluation of trace metals and sulfur gases from coal is supported by the Department of Energy. The NCSU Faculty

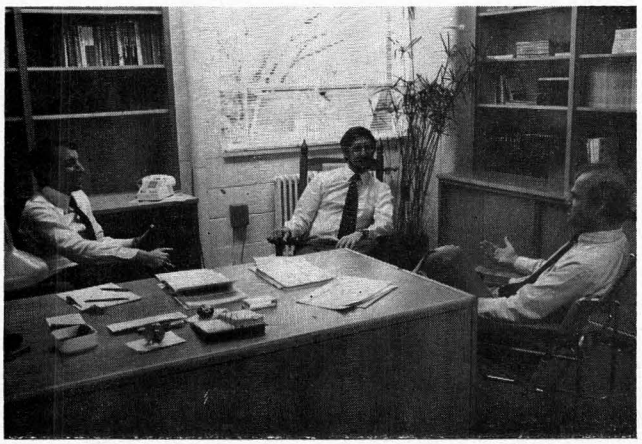


Professor Felder giving impromptu lecture on CSTR's.

Research and Professional Development Fund has supported the construction of a batch photoreactor, measurement of beta spectra emitted by a slab source, and dynamic simulation of a pulp chlorination tower.

The research efforts described above have been marked by the same thoroughness and quality as Rich's teaching. He was given the 1974 NCSU Sigma Xi Research Award for superior accomplishments in the field of scientific research.

Rich has unselfishly contributed to other research programs in the Department. His library of computer programs is extensive and he makes



Felder with colleagues, Hal Hopfenberg (Department Head) and Ron Rousseau.

them available to colleagues and students. Furthermore, he can generally be counted on to have the latest information on analytical instrumentation. When the coal gasification research project got underway, there was a need for someone to learn capabilities of various instruments available for analyses of coal and char, waste water and gases found in the gasification/gas cleaning pilot plant. Rich accepted the responsibility and maintains an expertise in the use of an array of instruments, including atomic absorption spectrometer, ion chromatograph, gas chromatographs, sulfur analyzer, nitrogen analyzer, etc.

Despite the enthusiasm Rich has for these research efforts, he never loses sight of the proper relationship between university research and graduate students. He is concerned with their total professional and personal development, as well as their accomplishment of short range goals like accumulating data points and, ultimately, a degree.

None of Rich's students has the slightest reluctance to take their "problem of the day" to him. His mortality and temper have been observed, however, when a student has just broken the third *calibrated* rotameter in a single day.

WRITER

NO DESCRIPTION OF RICH FELDER would be complete without mentioning his enjoyment of the written word. (That's not to say he doesn't like the spoken one, too.)

Although the 45 publications mentioned earlier and the textbook *Elementary Principles of Chemical Processes* may be indicative of the quality of Rich's writings, they are not true indicators of the quantity. He is prolific. It is common knowledge among graduate students that any question may result in being given a handout specially prepared for such occasions. A look around his office will reveal stacks of documents he has written on everything from "What is Chemical Engineering" to "Radiotracer Applicators in System Analysis."

Writing a paper or a book with him can be both excrutiatingly painful and exhilirating. It can be painful because Rich's search for just the right word or phrase can result in numerous rewritings. None of his students or colleagues can escape his trusty scissors, tape and stapler. His saving grace in this regard is that he is just as likely as not to rewrite one of his own drafts. And the exhilirating part is that the document always sounds and reads superbly.

It seems only fitting that I say a few words about Rich's unique contribution to our joint authorship of *Elementary Principles of Chemical Processes*. This textbook was published in 1978 and has been adopted for use at approximately 80 Departments of Chemical Engineering in the United States, several European universities, and will be translated into Spanish and Chinese. Two characteristics of the book which have been a factor in its widespread adoption are its pedogogical approach and style of writing. Quoting from a review of the book that appears in the *AIChE Journal, 25,* 382 (1979), ". . . the style and level of presentation of the content is excellent, and the subject matter represents the ideal body of knowledge which should be imparted to students in the first year of a chemical engineering curriculum." These features are primarily the result of Rich Felder's insight into what students need to facilitate learning and his very special gift with the written word. In addition, the exploits of Sebastian Goniff, Johann Sebastian Farblunget,

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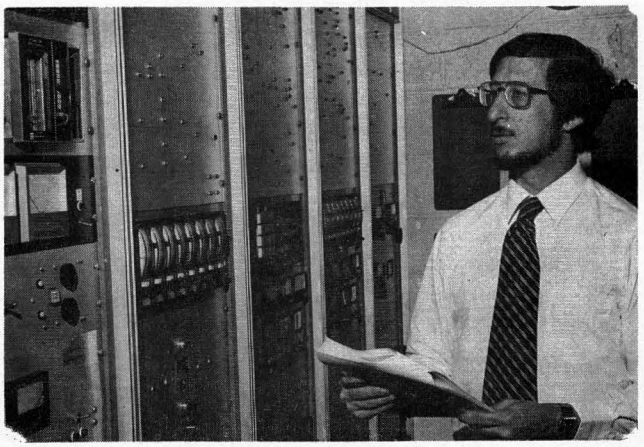
Edd Seddera and other seedy but colorful characters sprinkled throughout the text, are illustrations of his sense of humor and his ability to couple wit with the illustration of chemical engineering principles.

LIFE AND TIMES

AFTER A CHILDHOOD IN Manhattan, Queens, Buffalo and North Miami, Rich settled down to make good grades and enter the City College of New York to study chemical engineering. Why Chemical Engineering? (a) Everyone who knew anything in 1957 was going into engineering and (b) he was intrigued by the idea of mixing colorless liquids to produce a bright orange (his favorite color and the reason for his subsequent



Felder posing (i.e. acting like he's doing something) in front of coal gasification/gas cleaning pilot plant control panel.

matriculation at Princeton) fluid. Why CCNY? He didn't like the letter MIT wrote to him, and think of all the carfare he saved.

He graduated from City College No. 2 in engineering and entered graduate school at Princeton. His interests became chemical physics, Barbara Cowl (whom he married), and hopeless liberal causes, not necessarily in that order. He was Morton Kostin's first graduate student, but he claims his major achievement was a catch in a softball game for which he is still revered by old timers on the Princeton faculty like Ernie Johnson and Bob Axtmann. He also tried Electrical Engineering at Princeton but, on falling through the ceiling at 224B Halsey Street while installing air conditioner wiring, he decided his future remained in Chemical Engineering.

He enjoys music ranging from Mozart to McCartney and is especially fond of playing classical guitar, but he likes to play in groups so that his mistakes are less obvious . . . he also memorizes Gilbert and Sullivan patter songs, believing that someday they will come in handy.

Following his Ph.D., he spent a year at Harwell, England as a NATO postdoctoral Fellow, and two years at Brookhaven National Laboratory. His research interests had now shifted to photoreactor design and analysis, and mixing effects in reactors. Letting it become known that he was interested in an academic career, some enlightened soul recommended he interview for a vacant position at North Carolina State University. With his interest in United States geography confined to the blighted land mass east of the Hudson River and the hedonistic environment surrounding the San Francisco Bay, he is reported to have uttered the famous quote for which many New Yorkers later claimed credit: "North Carolina??? Get serious, wouldja!!". Nevertheless, being basically curious, he came, he saw, he stayed. Why? He fell in love with the school, faculty, and (you guessed it) North Carolina. He claims never to have regretted the decision, except when he finds himself almost enjoying eating grits with red eye gravy.

He maintains his passion for hopeless liberal causes, bialys with whipped cream cheese and Chivers Olde English Marmalade. He enjoys music ranging from Mozart to McCartney and is especially fond of playing classical guitar, but he likes to play in groups so that his mistakes are less obvious. He is often awed by our friend and colleague Jim Ferrell, who makes and plays classical guitars. You're not going to believe this, but he also memorizes Gilbert and Sullivan patter songs, believing that some day they will come in handy.

Rich is also the devoted father of Kenneth, Elena and Gary, ages 14, 12 and 10. Despite his tireless professional efforts, he always seems to have enough energy left over to spend time with his children. One of his passions that he indulges in frequently is being beaten in chess by these budding Bobby Fishers. As a father, he exhibits a degree of patience and concern which reflects his feelings about children and, in fact, all people. □