

DERAN HANESIAN

of the New Jersey Institute of Technology

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Deran Hanesian has taught chemical engineering and chemistry for thirty-three years. Reflecting back, he ponders, "How did my career evolve? There were no established goals, no firm plans." Perhaps his life's work and effort fulfilled the hopes and dreams of Armenian immigrant settlers in America who had survived a massacre.

Deran was born in Niagara Falls, New York. The city had a heavy concentration of electrochemical and electrometallurgical industries offering an abundance of opportunity for unskilled workers that attracted a hopeful immigrant population. Deran's parents, Vahan and Anna, had both survived the 1915 genocide of the Armenian people by the government of Ottoman Turkey. Vahan was the sole survivor of a large family, and the victims of the massacre included his young wife and son. He escaped to South America and eventually worked his way north to the United States. Deran's mother was orphaned by the massacre at the age of twelve, with only a few members of her family surviving. Anna, together with an older sister and her son and a younger sister, eventually made it to Aleppo, Syria. (Twenty years later, a younger brother, who was six years old at the time of the genocide, was miraculously found on the Turkish-Syrian border, and in 1973, following fifty-eight years of separation, he and Anna were reunited in Niagara Falls.)

After searching for his first wife and family for ten years. Deran's father gave up hope that his family was alive, and on a subsequent trip to Syria he met and married Anna, bringing her to America as his bride. Eventually, Anna brought her younger sister to Niagara Falls, where she also married and raised her own family. Together, the two families raised seven children in a five-room apartment.

In 1927, Deran was the firstborn child of Vahan and Anna. After the Stock Market crash of 1929 and the Great Depression of the 1930s, many industries in Niagara Falls laid off workers, and Vahan's employer, the Aluminum Company of America, completely shut down, making life even

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more difficult for the immigrant families. Only intermittent jobs with the WPA were available to him until ALCOA reopened in 1940 because of World War II. Consequently, Anna never realized her wish to bring her older sister and sister's son to America, and in 1946 they emigrated from Beirut to settle in the Soviet Republic of Armenia.

Despite the poverty of the depression years, both families maintained a hopeful atmosphere. All of the children began working at an early age, contributing their earnings to the family's purse. Armenian was the language spoken at home; English was learned in kindergarten.

Although the children excelled in school, economic hardship excluded any hope for a college education. Following the suggestions of his junior high school guidance teacher, Deran at first concentrated on commercial studies such as bookkeeping, business arithmetic, shorthand, and typing, with a factory office job as the occupational goal. Fortunately, he enjoyed mathematics and loved history, and he simultaneously studied these subjects. During the second half of his eleventh year, however, he changed to a math and science course of study, and in 1945 he graduated from Niagara Falls High School with high honors.

World War II was raging during Deran's high school

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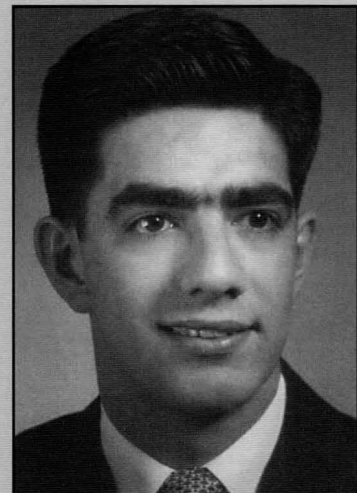
The Beginning . . .

*Deran against the backdrop of
Niagara Falls*

. . . through

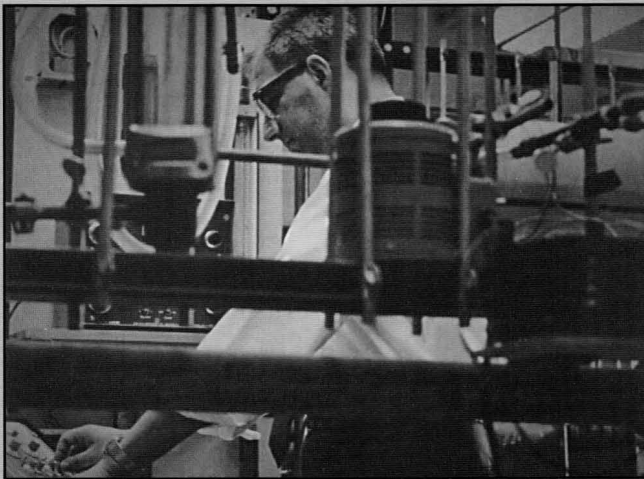
*Deran in the military
and*

Deran the Cornell student



to the present . . .

*Deran the chemical engineering
educator and researcher*



years. To participate in the war effort, he worked as an inspector at the Auto-Lite Battery Corporation after school during the school year and in the summer months. He continued working at the plant after he graduated from high school, expecting to be drafted into military service when he reached the age of eighteen in September.

Late in July, however, Deran's mother suggested he apply for admission to a college despite the family's lack of financial resources. Deran wanted to be an engineer, and the only school he knew in close proximity to home that offered engineering was Cornell. While in high school he had built a transit for surveying and was very interested in trigonometry, so he completed Cornell's application for its civil engineering program. Fortunately, he belonged to the Niagara Falls Boys' Club where activities after school included working, playing billiards, basketball, and sandlot football. He had become good friends with the club director, Mr. Field, and when he asked Mr. Field to serve as a reference on his application, Mr. Field suggested that Deran become a chemical engineer because "civil engineering was too political." Deran immediately crossed out the word "Civil" on the application, substituted "Chemical" above it, and mailed it to Cornell. With this stroke of a pen, a career began.

Deran was accepted into Cornell's chemical engineering program. Cornell was on a war-time schedule, and the semester was to begin in November. In late September, however, Deran became eighteen, registered for the draft, passed the physical, and was summoned to active duty in the U.S. Army. He wrote to Professor Fred H. "Dusty" Rhodes, the department director at Cornell, about his circumstances. Dusty told Deran to complete military service, assuring him there would be a place at Cornell when he returned. He also told Deran not to worry about money, assuring Deran there was financial support for promising students. Dusty's words proved to be true, for in Deran's last two years at Cornell, he was awarded a scholarship.

Deran served as Private First Class, first in the Medical Corps at Fort Dix, New Jersey, later in the Corps of Engineers at Fort Belvoir, Virginia, and finally, at the Yuma, Arizona, Engineer Test Center. He was discharged from

the Presidio in San Francisco.

After his discharge from the Army, Deran visited a cousin's farm in Fresno, California, and the visit convinced him that his family should move from Niagara Falls to Fresno and become grape farmers. When he returned to Niagara Falls and presented this "great" idea to his father, he was unequivocally told that he was to go to college. Education was greatly valued by his parents. Deran's mother had been completely deprived of any schooling, and although his father had only completed the sixth grade, he was a poet and an intellectual who loved to read and write. Deran remembers these dreams and wonders—what would his life have been like as a grape farmer?

UNDERGRADUATE SCHOOL

Deran entered Cornell armed with the GI Bill of Rights and a War Service Scholarship, but in his freshman year, his father's employer again shut down, so Deran's GI stipend had to help support the family. From the time of his arrival at Cornell until he completed the five-year program, Deran worked at various part-time jobs. Such a heavy workload made undergraduate study extremely difficult. During the freshman orientation for the approximately 135 new students, Dusty stated, "All of you came to Cornell from the top of your high school classes. Not one of you had less than a ninety percent average in high school. However, look at the two people on your right and the two on your left, shake their hands, and tell them you probably won't see them at graduation." Dusty was right—only thirty-five graduated.

Deran held on despite the fact that in his third year his father passed away and the family finances became extremely desperate. Although those years were difficult, Deran was determined to become a chemical engineer. The five-year program was completed on schedule.

THE EARLY DU PONT EXPERIENCE

At the time of Deran's graduation, the chemical industry was in rapid growth. He accepted a hometown position at the Electrochemical Department plant of E.I. du Pont de Nemours, Inc., and became involved in production and development work at the Adiponitrile plant. He was also occupied at the Lysine manufacturing semi-works plant doing research on a new product where he was the supervisor of the first three steps of a seven-step process. Those years at du Pont impressed upon Deran the importance of techni-

cal ability coupled with good communication skills, both written and oral. As a field engineer, he was always thankful for the discipline to which the faculty at Cornell had subjected him.

The du Pont years were challenging, but Deran found that climbing the production management ladder was an unsatisfying pursuit. He needed something more. While problems appeared and then disappeared in production work, it was

often not understood how the problem developed or how it was resolved. Delving into problems more deeply and solving problems scientifically were precluded by the need to move on to solve a prevailing new problem. This frustrating aspect of production work was nevertheless offset by learning more about the nature of chemical equipment. Deran also developed rewarding interpersonal relationships with plant operators and maintenance workers who had a great deal of practical learning. In applying the theoretical knowledge gained at Cornell to

real industrial problems, Deran's understanding of chemical engineering was greatly expanded.

GRADUATE SCHOOL

Deran's temperament for research motivated his desire for graduate study. In late 1956, he went to Cornell to discuss the matter with Chuck Winding, the director of chemical engineering. Deran remembers, "Chuck was kind to me, he was sensitive to my problems as an undergraduate and to my current desires, and he accepted me into the graduate program."

The graduate years, which began in September of 1957, were very different from Deran's undergraduate experience. With five years of strong industrial experience behind him and more adequate finances, graduate school proved to be less difficult. He recalls, "I worked very hard the first semester, having forgotten how to integrate and differentiate. I had to relearn almost everything." Progressively, however, things became easier, and he was soon accepted into the PhD program.

Deran's thesis for the PhD degree was on "Simultaneous Heat and Mass Transfer in a Packed Liquid-Liquid Extraction Column." Temperature differences of 0.1°C between phases were measured by the newly developed thermistors. His advisor, Professor Robert von Berg, had many years of experience at du Pont and in the nuclear industry. He says he is indebted for much of his graduate training to Professors



Deran, with his seniors, operating the ammonia absorption experiment in the chemical engineering laboratory.

von Berg and Peter Harriot, for whom he was a teaching assistant in the chemical engineering laboratory. Professors von Berg and Thorpe also guided Deran in teaching the sophomore stoichiometry course. Deran completed all graduate studies for the PhD requirements in a brief period of three years.

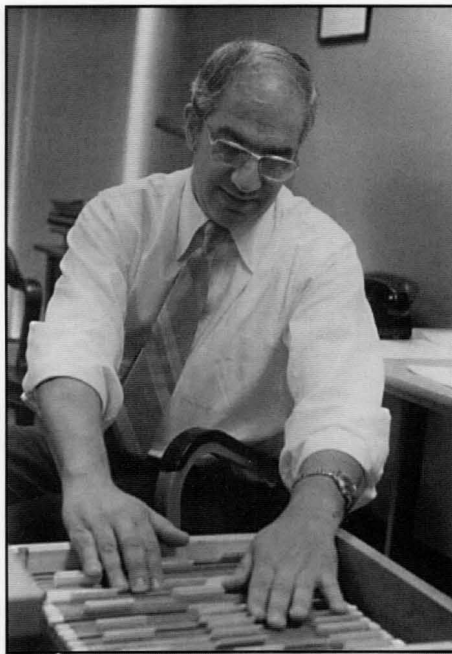
RESEARCH AT DU PONT

Following graduate studies, Deran decided to return to a research position at du Pont's Jackson Laboratory, Chamber Works, Organic Chemicals Department, in Deepwater, New Jersey. Given two research projects from which to choose, his preference was to work on the development of dielectric gases for electrical transformers based on chlorofluorocarbon chemistry. The work was a combination of fundamental research, laboratory experimentation, field work, and market development. With his technicians, he designed and built a new laboratory. Deran became involved with the various technical societies concerned with the establishment of text standards. Traveling nationally to numerous professional meetings brought him into contact with scientists from competing companies. It was extremely enjoyable and challenging work. "Those were great years in the Wilmington, Delaware, area," Deran remembers, "I was in my mid-thirties and for the first time in my life I felt confident and secure."

THE NJIT YEARS

Despite his success at du Pont, Deran felt he should try teaching. "If I didn't like it, I could always return to industry because I had received excellent performance evaluations at du Pont." Deran preferred to locate in the New York or Boston area. He remembered that his friend, Tom Weber, had obtained an MS degree at Newark College of Engineering (NCE) in New Jersey while he worked at Exxon, so Deran applied there, and after an interview with Charlie Mantell, the department chairman, he was given an offer on the spot. Deran asked Charlie if he could have some time to think it over because other schools had also expressed an interest. Charlie replied, "Sure, take a week"—those who knew Charlie will understand his response. Deran reasoned that a "bird in the hand is worth two in the bush," and accepted the offer.

It was 1963, and the first step of his teaching career had thus been taken. It is ironic that Charlie started Deran on his teaching career—Charlie was a renowned consultant and authority in electrochemical engineering, and one day he and Deran were having an informal conversation when the



Deran as department chairman.

subject changed to Niagara Falls. Charlie casually informed Deran that before coming to NCE in 1948, he had served as a consultant for ALCOA, and that on two occasions, in 1929 and again in 1947, he had been involved in a recommendation to shut down the Niagara Falls plant. Deran had come face to face with one of the men who had been part of the fateful decision that resulted in so much suffering for his family.

Teaching

Students at NCE were primarily members of local working-class families. The college was focused toward its undergraduate school and teaching loads were very heavy. Deran was assigned an eighteen or nineteen contact hour load per semester, with four to five preparations. His assignment included teaching chemistry courses. Since NCE did not offer a degree in chemistry, the chemists teaching higher level chemistry courses were a part of the chemical engineering department. Deran states, "I quickly learned what teaching was all about and how to teach. Each student had special needs that must be quickly recognized and addressed in order to reach them. I learned that if you couldn't reach them, you couldn't teach them." He taught every course in the chemical engineering curriculum at the undergraduate level, taught chemistry courses, developed graduate courses in chemical reaction engineering, and developed undergraduate technical electives.

In 1966, a large step change occurred. NCE was told that unless it reduced teaching loads to twelve contact hours, it would lose its accreditation. Many faculty were hired, and Deran, who had many years of teaching and industrial experience, was called upon to guide his new colleagues.

Deran had volunteered to develop the Process Dynamics and Control Course, and in 1966 received a NSF grant to build a related laboratory. In 1968, the department was notified that it would have a new building. Deran was a member of the committee assigned to design the new building and to construct a new chemical engineering laboratory. He and Dr. Perna visited numerous universities, selected appropriate ideas, and synthesized the concept of the current laboratory and laboratory course. With success, substantial funding was received from industrial, state, and federal sources to implement these concepts.

The years 1967-75 were heavily involved with numerous research projects, the development and teaching of undergraduate courses, new graduate courses, and building the new chemical engineering laboratories. More than thirty unit

operations experiments were built in the four summers from 1972 to 1975. The late Professor Vinnie Uhl, on a visit from the University of Virginia, praised the laboratory, stating "the only other laboratory of comparable quality that I have seen was in Germany." Faculty from other schools came to see the facility and used it as a model for their own laboratories. Deran's continuous involvement and teaching experiences in the chemical engineering laboratory resulted in publication of an extensive *Chemical Engineering Laboratory Manual*, followed a few years later by a second edition.

In 1988, Deran became reinvolved in teaching stoichiometry to sophomores and transfer students. He also undertook the challenge of teaching a large lecture class in chemistry that was required for all freshmen students.

Deran and Angie Perna are presently participating in a National Science Foundation consortium of ten universities and have developed a Chemical Engineering Measurements Laboratory for freshmen as part of the Fundamentals of Engineering Design program. This course is also offered in the Institute's Summer Academy for outstanding high school students. During recent summers, they have also been working with 9-14 year old girls in the FEMME program, teaching the young ladies the basic principles of chemical engineering in the Unit Operations Laboratory. A grant has also been received for the Advance Technology Center program in pollution prevention.

Administration

A new era of significant changes in the department began in 1975. The name of the institution, Newark College of Engineering, was changed to New Jersey Institute of Technology (NJIT), and Deran was selected as chairman of the combined departments of chemical engineering and chemistry. A few years later it became the Department of Chemical Engineering, Chemistry, and Environmental Science, granting degrees in all of these fields. At its peak, it was among the largest departments in the United States, with approximately forty faculty, twenty technical and support staff, and numerous adjunct faculty.

One of the department's distinguished achievements during Deran's tenure as chair was the growth of the undergraduate scholarship, merit award, and graduate fellowship program. The department's aid program grew rapidly and at its peak in the mid-1980s awarded seventy-five merit awards,

fifteen scholarships, and seventeen graduate fellowships for a total of \$57,100 in aid to students. Almost thirty percent of all chemical engineering students were receiving some financial aid at that time.

Teaching allowed Deran, a registered professional engineer, flexibility to continue industrial research for seven summers at du Pont and the various Exxon affiliates and presented opportunities to serve as consultant to other industrial concerns over the years. Concurrently, his industrial research experience became a reservoir that provided new courses for the NJIT curriculum.

Deran has always been active in professional societies and took special interest in student societies such as AIChE, ACS, Omega Chi Epsilon, and the Biochemical Club. From 1971 to 1990 the NJIT AIChE chapter was voted by National AIChE as an outstanding chapter in the United States, a national record of twenty consecutive years that still holds.

The laboratory focus during Deran's tenure as chairman turned to on-line, rapid data reduction and analysis. As part of the CACHE/NSF project on the Modular Instruction Series, Deran was invited to submit two modules on reaction kinetics and chemical reactor design. He coauthored the two modules with faculty from India and Venezuela that are part of the AIChEMI Series.

In the thirteen years that Deran was department head, he focused on being an effective administrator while continuing to teach a half-time load of two courses. The graduate courses that he developed attracted students and served as a source for his research program.

Research

The launching of the Soviet Union's Sputnik in 1957 prompted a surge of growth in NCE's research and graduate programs, and Deran was involved from the start. In a single year (1972), one of the three PhD degrees and eight of the twenty-five MS degrees granted were given to his students.

In 1964, Deran became involved in an adhesives study with one of his fellow organic chemists and an orthodontist. The work concerned replacing metal appliances on teeth with plastic pieces adhering to the tooth's surface. Concurrently, he began to develop a research program primarily in areas of reaction kinetics, including the effects of ultrasound on reaction rates and in fluidization.

In the summers of 1964-66, Deran returned to du Pont's Jackson Laboratory and performed research on a new process to produce chlorofluorocarbons. This effort led to the construction of a plant in Texas. Many of the problems encountered during the research later served as the basis of student theses. Beginning with the summer of 1967, he worked with Exxon's Bayway Refinery developing a kinetic model for the ethane-propane pyrolysis furnace, and this

work eventually led to several research projects involving simulations and the development of new undergraduate electives.

After more than a decade as department chair, in 1988 Deran accepted a summer position at the Center for Plastic Recycling Research (CPRR) at Rutgers, The State University of New Jersey, and continued his work there during the 1988-89 academic year. When the center's director later resigned, Deran was asked to serve as Acting Deputy Director because of his administrative abilities and experience. He accepted, and his relationship with CPRR continues to the present. He has been involved in research in all areas of recycling and in soil remediation

Service

The trust placed in Deran by the NJIT faculty was expressed by his election to the office of Faculty Council Vice Chairman and Chairman. He also has served on the Institute Promotion and Tenure Committee. He has served and held leadership offices on numerous AIChE and ASEE committees over the years, and is a Fellow and life-member of ASEE and a Fellow and Emeritus Member of AIChE. Membership in various other professional societies include American Chemical Society, Society of Plastics Engineers, Omega Chi Epsilon, Alpha Chi Sigma, Fulbright Association, and the American Association of University Professors.

Deran has also been active in the community and serves both the Diocese of the Armenian Church and the Parish Council of St. Sarkis Armenian Apostolic Church in Niagara Falls.

INTERNATIONAL OUTLOOK

Deran has been a tireless teacher to a wide international community of students. In 1978, he taught at the Algerian Petroleum Institute, in 1981 he taught at the University of Edinburgh in Scotland, and in the spring of 1982 he received a Fulbright grant to teach at the Yerevan Polytechnic Institute in the Soviet Republic of Armenia., where he lectured in Armenian on chemical engineering subjects. He was instrumental in establishing an exchange agreement between NJIT and the Polytechnic Institute.

When the Iron Curtain was lifted, allowing restricted travel to the USSR, Deran was one of the first to travel to the



Deran, here receiving NJIT's Robert W. Van Houten Award for Teaching Excellence on graduation day, 1977.

former Soviet Republic of Armenia in 1962. He found his aging aunt who had rescued and raised his mother following the 1915 genocide by the Ottoman Turks. Since that meeting, Deran has returned fifteen times to the tiny land that is all that remains of his decimated ancient heritage, assisting in the development of a democratic, independent Armenia.

CAREER HIGHLIGHTS

The most cherished honor of Deran's teaching career was receiving NJIT's Robert W. Van Houten Award for Teaching Excellence in 1977, given annually to the professor chosen by vote of alumni who have graduated within the closest five-year period.

Other awards followed: ASEE's Mid-Atlantic, AT&T Foundation Award for Excellence in Instruction of Engineering Students; ASEE's Centennial Certificate; the John Fluke Award for Excellence in Laboratory Instruction; and the first recipient of NJIT's award for "Outstanding Professional Development by a Tenured Faculty Member," given to "tenured faculty members who have demonstrated significant achievement in teaching effectiveness and innovation over a substantial period of time...."

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The special insights Deran gained have been disseminated through publication in professional journals and through oral presentations at professional society meetings. This reciprocity between teaching and industrial experience has been a rich, synergistic relationship for Deran, leading to global and humanitarian endeavors.

Deran looks back in amazement at the evolution of his career over the years. It was a cooperative effort, an investment in the future of one person by many others. Deran says, "I was lucky—I had good family, good friends, good teachers, close colleagues, and dedicated coworkers. Our students have always felt a strong commitment and sense of belonging to the department and the institution that was theirs. For all this, I am grateful." □