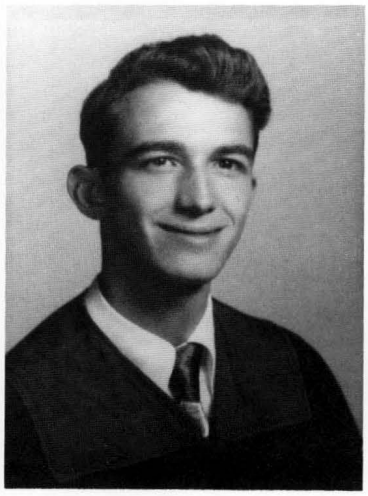
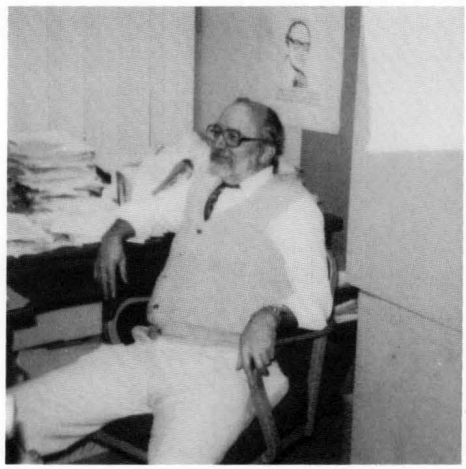
ChE *educator*



ANGELO J. PERNA

of the New Jersey Institute of Technology



↑ ***First . . . the student (1950) — and then . . . the teacher (1991)*** →

DERAN HANESIAN
New Jersey Institute of Technology
Newark, NJ 07102

Angelo J. Perna (or Angie, as he is more familiarly known to friends and colleagues) was born in Brooklyn, New York, in 1931, to Vito and Marie Perna, who had immigrated to the United States from Italy. He was the fourth child in a family of eight children.

Although Angie's early years paralleled the great depression in the United States, the Perna family was never unduly affected since Vito was self-employed and was able to continuously provide for his family. Education was always highly stressed in the Perna household, and the children were encouraged to help one another to excel in academics.

Angie enjoyed, and was accomplished in, both academics and sandlot sports as he was growing up. He participated in baseball and football activities and was on several championship teams in each sport. He says that he always knew he would eventually go to college and become a teacher, but during his early years he was undecided whether to pursue engineering or history as a career—although he enjoyed chemistry and mathematics, it was in history that he received early academic recognition.

When Angie was a junior in high school his father passed away after a long bout with cancer. The lengthy siege of illness had created such a serious financial drain on the family resources that when Angie graduated from high school the following year, he had to postpone his plans for college and join the workforce instead. He worked first for the Motion Picture Association of America and later in the garment industry before being drafted into the United States Army in January of 1952.

Angie was sent to Camp Breckenridge, Kentucky, for basic training before being sent to Korea in June of 1952, where he served with Company K of the 279 RCT attached to the 45th Division until August of 1953. While in Korea he rose to the rank of staff sergeant and earned several battle stars and the Combat Infantryman's Badge.

Angie was honorably discharged in November of 1953 and through the GI assistance program he was finally able to begin his postponed college eduction. It is interesting to hear how he made the decision to attend Clemson and take up chemical engineering:

> ***When I got out of the service I felt I could not go to a school in the immediate area and live at home. I really wanted to go to Brooklyn Poly, but since all of my friends were now working, I knew I would be socializing with them, and I could never have undertaken a course of study while continuing to intermingle with my friends; therefore, the school I attended had to be one which was far enough away so that I had to live***

© Copyright ChE Division, ASEE 1991

there instead of at home. In addition, it had to be inexpensive enough so that my savings and my GI support could see me through the studies. Insofar as to why I chose chemical engineering—this was simple. I happened to read an article in the New York Times which gave a salary survey for all engineers, and chemical engineers were paid the most. This fact appealed to me, and since I had done fairly well in chemistry, my field of study was now fixed. As for Clemson, a cousin of mine had gone there prior to the second world war and a high school classmate of mine was currently attending—and both of them were enthusiastic about the place. So I thought, "Why not?" In addition, I remembered they had a pretty good football team (even in those days). I saw in the college catalog that they offered chemical engineering and that it was fairly inexpensive, so I applied for admission, and I was accepted. I entered the school in January of 1954. These decisions were the most fortuitous ones I have ever made, and I have been thankful to the fates ever since. I found a school I respect, a profession I love, and I met not only a great group of classmates, but also Dr. Charles E. Littlejohn.

Dr. Littlejohn was a dedicated teacher who instilled a sense of pride and professionalism in his students, and he had a marked effect on Angie's life. Even in the face of all of Angie's eventual technical accomplishments in teaching and research, it is the area of service to his colleagues and his profession in which he places the greatest value. He credits Charley Littlejohn with instilling in him a sense of responsibility toward both his chosen field of endeavor and its related professional organizations.

After graduation from Clemson, Angie joined Union Carbide where he worked at the Y-12 plant in Oak Ridge, Tennessee. While there he worked as a production engineer, as a research-development engineer, and finally as a production scheduler. He found himself working on innovative powdered metallurgy techniques and isostatic pressing—interesting work, but classified since it dealt with thermonuclear weapons.

After more than three years at Union Carbide he decided to return to school to work on his Master's degree and to continue with his plan to enter the teaching profession, so in September of 1960 he returned to Clemson and became a member of the initial graduate class in chemical engineering.

During this period of time Angie became interested in the environmental area through his interaction with George Meenahan, a professor in chemical engineering, and Gene Rich, chairman of the civil engineering department and author of *Unit Operations of Sanitary Engineering.* Angie helped Dr. Rich by reviewing his book and (together with a classmate, Bill Huffman) by solving the text problems. This period of time had a great influence on his strong belief that chemical engineers are ideally suited by their training to be a force in solving the challenges that the environment presents. It was

Even in the face of all of Angie's eventual technical accomplishments in teaching and research, it is the area of service to his colleagues and his profession in which he places the greatest value.

during this time that Angie also began his association with the unit operations laboratory when, as a graduate assistant, he was given the responsibility for the lab.

After obtaining his Master's in 1962, he went to VPI to teach metallurgy for a year before going on to the University of Connecticut for his PhD degree. His classmates at UConn were an unusual group since, like Angie himself, all of them had been out of college for a period of time prior to returning to college to pursue advanced degrees, and all of them eventually went into teaching. The group consisted of Herb Klei and Mike Howard of UConn, George Knepple of William Patterson, and Pat Marino.

While at UConn, Angie was an instructor in chemical engineering and taught the unit operations laboratory. He did his research under Dr. L.F. Stutzman in the area of distillation dynamics and control.

After receiving his PhD, Angie joined the Department of Chemical Engineering and Chemistry at Newark College of Engineering in Newark, New Jersey, and he and I began what was to be a long cooperative effort. In the late 1960*s* we worked together on a five-story unit operations lab and a separate process dynamics and control lab, and in addition to designing about thirty experiments, we successfully wrote proposals and received funding from NSF, the State of New Jersey, and the industrial sector, amounting to approximately one-half million dollars. We developed a new teaching format that included a six-hour once-a-week lab with three different types of lab reports and oral student presen-

Contined on page 86

to Surfaces, G. Bitton and K.C. Marshall, eds, John Wiley and Sons, New York, NY (1980)
20. Hirtenstein, M., and J. Clark, "Microcarrier-Bound Mammalian Cells," in *Immobilized Cells and Organelles,* B. Mattiasson, ed., CRC Press, Inc., Boca Raton, FL (1983)
21. Adams, J.M., L.A. Ash, A.J. Brown, R. James, D.B. Kell, G.J. Salter, asnd R.P. Walter, "A Range of Ceramic Biosupports," *Am. Biotech. Lab.,* October (1988)
22. Messing, R.A., "Carriers for Immobilized Biologically Active Systems," *Adv. Biochem. Eng.,* **10**, 52 (1978)
23. Zaborsky, O.R., "Immobilization of Enzymes by Adsorption," in *Biomedical Applications of Immobilized Enzymes and Proteins, Volume I,* T.M. Chang, ed., Plenum Press, New York, NY (1977)
24. Zaborsky, O.R., "Covalent Linkage: III. Immobilization of Enzymes by Intermolecular Cross-Linking," *ibid.*
25. Costerton, J.W., "Some Techniques Involved in Study of Adsorption of Microorganisms to Surfaces," in *Adsorption of Microorganisms to Surfaces,* G. Bitton and K.C. Marshall, eds., John Wiley and Sons, New York, NY (1980)
26. Radovich, J.M., "Mass Transfer Limitations in Immobilized Cells," *Biotech. Adv.,* **3**, 1 (1985)
27. Enfors, S.O., and B. Mattiasson, "Oxygenation of Processes Involving Immobilized Cells," in *Immobilized Cells and Organelles,* B. Mattiasson, ed., CRC Press, Boca Raton, FL (1983)
28. Engasser, J.M., and C. Horvath, "Diffusion and Kinetics with Immobilized Enzymes," in *Applied Biochemistry and Bioengineering: Volume 1, Immobilized Enzyme Principles,* L.B. Wingard, E. Katchalski-Katzir, and L. Goldstein, eds., Academic Press, New York, NY (1976)
29. Pitcher, W.H., "Design and Operation of Immobilized Enzyme Reactors," *Adv. Biochem. Eng.,* **10**, 1 (1978)
30. Buchholz, K., "Reaction Engineering Parameters for Immobilized Biocatalysis," *Adv. Biochem. Eng.,* **24**, 39 (1982)
31. Turner, P.F., *Biosensors: Fundamentals and Applications,* Oxford University Press, Oxford, England (1987)
32. Vieth, W.R., *Membrane Systems: Analysis and Design,* Hanser Publishers, New York, NY (1988)
33. Suzuki, S., and I. Karube, "Immobilized Enzymes for Clinical Analysis," in *Enzymes and Immobilized Cells In Biotechnology,* A.I. Laskin, ed., Benjamin Cummings Publishing Co., Inc., London, England (1985)
34. Nillson, K., "Entrapment of Cultured Cells in Agarose Beads," in *Large Cell Culture Technology,* Hanser Publishers, New York, NY (1987)
35. Chibata, I., T. Tosa, and T. Sato, "Immobilized Biocatalysts to Produce Amino Acids and Other Organic Compounds," in *Enzymes and Immobilized Cells in Biotechnology,* A.I. Laskin, ed., Benjamin Cummings Publishing Co., London, England (1985)
36. Chibata, I., and T. Tosa, "Industrial Applications of Immobilized Enzymes and Immobilized Microbial Cells," in *Applied Biochemistry and Bioengineering. Volume 1. Immobilized Enzyme Principles,* L.B. Windgard, E. Katchalski-Katzir, and L. Goldstein, eds., Academic Press, New York, NY (1976)
37. Goosen, M.F., "Animal Cell Culture in Microcapsules," *Chem. Eng. Ed.,* **22**, 196 (1988)
38. Brodelius, P. "Immobilized Plant Cells," in *Immobilized Cells and Organelles, Volume I,* B. Mattiasson, ed., CRC Press, Inc, Boca Raton, FL (1983)
39. Goldberg, B.S., "A Novel Immobilized Enzyme Reactor System," paper presented at the 24th Annual Spring Symposium, AIChE, East Brunswick, NJ, May 10 (1984)
40. Change, T.M.S., "Biomedical Applications of Artificial Cells Containing Immobilized Enzymes, Proteins, Cells, and Other Biologically Active Materials," in *Enzymes and Immobilized Cells in Biotechnology,* A.I. Laskin, ed., Benjamin Cummings Publishing Co., London, England (1985)
41. Barker, S.A., and G.S. Petch, "Enzymatic Process for High-Fructose Corn Syrup," in *Enzymes and Immobilized Cells in Biotechnology,* A.I. Laskin, ed., Benjamin Cummings Publishing Co., London, England (1985)
42. Tanaka, A., and S. Fukui, "Bioconversion of Lipophilic Compounds by Immobilized Biocatalysts in the Presence of Organic Solvents," *ibid.* ❐

EDUCATOR: Perna

Continued from page 63

tations for the two-semester senior course. For twenty years now we have continuously worked on upgrading the laboratory experiments and its format.

During these years, together with colleagues in the civil engineering department, Angie also initiated cooperative efforts at the graduate level in environmental engineering. The first joint effort was to secure an interdisciplinary water-pollution training grant for graduate civil and chemical engineers, funded by the Federal Water Pollution Control Administration. This then led to the development of an interdisciplinary program in environmental engineering. Angie developed courses in unit operations of water treatment processes and in solid waste management processes.

Angie and John Liskowitz developed other highly successful joint research and programs that eventually led to numerous EPA research grants as well as an Exxon grant that funded an environmental toxicology option under the direction of Dick Trattner. Out of all these efforts came the impetus for the Institute for Hazardous and Toxic Waste Management and the NSF-initiated Haz-Tox Center.

While Angie's research efforts have been in the main environmentally oriented, his research interests span the spectrum from ultrasonic-aided mass transfer to characterization of leachate from MSV incinerator ash. His current interest is in MSW incinerator residue, which he has been working on jointly with Don Sundstrom and Herb Klei (University of Connecticut). This research is an outgrowth of a two-year (1988-90) stint as a visiting professor of chemical engineering and a research fellow at the Environmental Research Institute at UConn.

A fellow of AIChE and ASEE, he is the recipient of numerous citation certificates and awards, including the ASEE/MidAtlantic Western Electric Award, the DELOS Distinguished Service Award, and the ODK Award of Merit.

His AIChE activities include service on ten institute committees, Technical Program Vice-Chairman of the 1977 NYC Annual Meeting, and Chairman of both the Student Chapters Committee and the Educational Projects Committee. He has also served as a Director of the New York City AIChE local section.

In ASEE he has served on numerous committeess over the years, including Chairman of the 3M and DELOS Award Committees, in addition to holding ten elective offices, including Chairmanships of CHED, DELOS, and the Instrumentation Division.

In addition to the above professional activities, he has also served as Chairman of the ACS Mobay Committee, and as National President of Omega Chi Epsilon (the chemical engineering honor society), and President of the Association of College Honor Societies. He is also the author of approximately thirty-five papers, numerous presentations, coauthor of a book, and coeditor of three proceedings.

Angie's role in Omega Chi Epsilon deserves special attention. When Angie came to our department as a young assistant professor in 1967, I was Faculty Advisor of Omega Chi Epsilon, an honorary society with relatively few members at the time. I seized the opportunity to pass this advisorship on to our new young faculty member—I had more seniority and was being called upon with increasing frequency for other faculty business. Little did I realize what an impact this decision would have on the future of Omega Chi Epsilon. When he became advisor to our chapter in 1968, there were less than twenty national chapters in existence. After working intensively with our chapter, he became National Vice President of the organization in 1974 and then National President in 1978. When he completed his tenure as president he had expanded membership organization in Omega Chi Epsilon to forty chapters. He continued to work for the organization in his capacity as past president, and there are now forty-nine chapters nationwide.

His role as a national leader in Omega Chi Epsilon also led to the office of President of the Association of College Honor Societies, an umbrella group for the nation's more than sixty different honor societies.

These activities epitomize Angie's devotion to the profession. His volunteer involvement has always been intense, and he has given his time and talents happily and without thought of reward—his real reward has been his own satisfaction in having participated.

The multitude of people in our professional societies that Angie knows continually amazes me—and he always remembers their names! He and I have attended these meetings together for years, and although we were at the same sessions, he somehow always managed to meet many more colleagues than I, or anyone else, did. He never tires of meeting old, and new, friends and engaging in lengthy bull-sessions with them at meeting after meeting. His enthusiasm permeates the air at check-in and lasts long after everyone else is tired and ready to go home.

In addition to service on numerous department and institute committees at NJIT, Angie has been Chairman of the Faculty Council and President of the Professional Staff Association. He has also been a reviewer for NSF, EPA, AIChE, *CEE*, *I&EC*, *Engineering Education*, and the IACT, jr. He has been a consultant to the municipal and industrial sector, and during the summer of 1989 he served as a consultant and senior development officer to UNIDO in Vienna, Austria.

Angie's activities in the department include a stint as Acting Department Chairman (covering for me while I was on sabbatical leave) and as industrial fund raiser. During the 1970*s* his activities in fund raising led to a tripling of funds donated to the department and to the development of a Chemical Engineering Department Merit Award Program with its own endowment fund. At the present time he devotes his energies to teaching and the development of a Center for Municipal Solid Waste Studies.

When I was first contacted by *CEE* about the possibility of writing this article, I asked Angie for his permission and cooperation. He agreed with the one condition that he would be permitted to write the concluding paragraph for the article. It follows.

You know, I consider myself extremely fortunate in having had a department and an institute administration that has supported my activities at a number of professional society meetings, and I am appreciative of the large number of colleagues I have had the opportunity to interact with through the years. In many cases, these associations developed into strong friendships that I have grown to treasure. To all of these individuals and their families I would like to take this moment to express my sincere appreciation for their support and for the opportunity to have served with them, but mostly for their friendship over the years. I've got to say—I'm a very lucky fellow who has had a rewarding career. ❐