



IN MEMORIAM

Donald Oscar Pederson
Professor of Electrical Engineering and Computer Sciences, Emeritus
Berkeley
1925 — 2004

Donald Oscar Pederson was born September 30, 1925 in Hallock, Minnesota. He entered Iowa State College in fall 1943, but soon was drafted and served in Germany as a private in the U.S. Army from 1943 to 1946. Postwar, he completed his undergraduate education at North Dakota Agricultural College (now North Dakota State University) where he earned his B.S. degree in electrical engineering in 1948. He earned his master's and doctoral degrees in electrical engineering from Stanford University in 1949 and 1951, respectively. After receiving his Ph.D. from Stanford, Pederson stayed on for a period as a researcher in Stanford's young electronics research lab. From 1953 to 1955, he worked at Bell Telephone Laboratories, Murray Hill, New Jersey, and also taught night classes at Newark College of Engineering (now New Jersey Institute of Technology).

He soon concluded that he enjoyed teaching even more than his work at Bell Laboratories and in 1955, after contacting acquaintances in California, he was offered and accepted a position as an assistant professor at the University of California, Berkeley. Don was an exciting and popular teacher, well-remembered by generations of students. With his colleague Ernest Kuh, he coauthored *Principles of Circuit Synthesis*, a leading undergraduate text of its time. Later he authored another textbook, *Electronic Circuits*. His tenure at Berkeley also included stints as director of the campus's Electronics Research Laboratory and as vice chair and chair of the Department of Electrical Engineering and Computer Sciences. Pederson retired in 1991.

The year 1959 marked the invention of the integrated circuit (IC), changing the world of electronics forever. Don foresaw that dramatic reductions in size and cost of electronics would become possible and he became the preeminent international pioneer in university research and teaching on integrated circuits, now generally known as "microchips." Don decided that to undertake research in ICs and to teach students to design them, the university needed its own semiconductor fabrication facility. When he voiced this idea, he met a host of objections — building a "fab" was too complicated; his group was made up of engineers, not chemists; the university had no money for expensive fabrication equipment; and the project simply couldn't be done. Ignoring the objections, Pederson, with Professors Tom Everhart, Paul Morton, Bob Pepper, and a group of graduate students, started designing the facility. "Never wait for approval, don't tell anyone you are doing something, just do it," Pederson said later. "That's my motto."

Resourcefulness trumped the many difficulties associated with a major endeavor like this and by 1962 the new facility was operational, producing publishable research and educating an entirely new breed of engineers. Notable leaders from industry visited and praised the program and the facility — the first microfabrication facility at any university — and graduates of the program soon became leaders throughout the semiconductor industry. Microfabrication capabilities at Berkeley have advanced and grown steadily ever

since and today several hundred students and faculty members from a wide range of academic fields make use of an extremely flexible research facility.

In the mid-1960s Don became interested in the application of computer aids to the design and analysis of integrated circuits. He and his students used a Bendix G15 minicomputer, (the very one now displayed in the Museum of American History at the Smithsonian Institution) with only typewriter and paper tape input and output, to try to gain a deeper understanding of the behavior of certain circuit designs. Don became convinced that the computer would play a necessary role in the design and analysis of integrated electronics.

A decade of research, involving many undergraduate and graduate students, eventually produced the integrated circuit computer simulation program called SPICE (Simulation Program with Integrated Circuit Emphasis). The program allows engineers to analyze and design complex electronic circuitry with speed and accuracy. Virtually every electronic chip developed anywhere in the world today uses SPICE or one of its derivatives at critical stages during its design. Don and his students have made many other contributions to electronic design automation along the way as well, in areas from device modeling, mixed- mode simulation, rule- based circuit diagnosis, to macromodels.

SPICE was one of the first significant open source computer programs. The policy established by Don was that SPICE was available free of charge to any chip designer. The only requests he made were that if a software error was found, or a new feature added, it should be sent to Berkeley so it could be made available to all the other SPICE users, and that if the program was distributed further, no charge be made for the software developed at Berkeley. Don's policy accelerated the improvement of SPICE and its enhancement with many new features and has been used effectively by many faculty members at Berkeley since those early SPICE days.

Soon after Don retired, former students and colleagues made substantial gifts to endow a professorship in his name, and to pay for major renovations on the fifth floor of Cory Hall in a student area now identified as the Donald O. Pederson Center for Electronic Systems Design.

He was elected to the membership of the National Academy of Sciences in 1982 and the National Academy of Engineering in 1974. He garnered numerous other honors and awards, including a Guggenheim Fellowship in 1968, an American Association for the Advancement of Science Fellowship in 1988, the Berkeley Citation in 1991, the Phil Kaufman Award from the Electronic Design Automation Consortium in 1995, and the Medal of Honor from the Institute of Electrical and Electronics Engineers in 1998. He also received an honorary doctorate from Katholieke Universiteit Leuven in Belgium.

Don Pederson died on December 25, 2004, aged 79, of complications from Parkinson's disease. He is survived by Karen, his wife of 27 years; four children from his first marriage, to Claire Nunan — son John, daughters Katharine Rookard, Margaret Stanfield, and Emily Sanders; and four grandsons, all in California.

David A. Hodges

Paul R. Gray

A. Richard Newton