



*Al F. Jacob*

## AL F. TASCH, JR.

1941–2004

Elected in 1989

*“For outstanding contributions to semiconductor memory technology.”*

BY LOUIS C. PARRILLO

**A**L F. TASCH, JR., Cockrell Family Regents Chair Professor at the University of Texas at Austin and truly a giant in the semiconductor industry, passed away at Seton Medical Center in Austin on November 30, 2004. To many of us who knew him well, Al was a devoted husband, a loving father, a faithful friend, a staunchly devout man, and a great scientist and leader.

Al was born May 12, 1941, the son of Dr. Al F. and Dorothy Tasch. He received his B.S. degree in physics in 1963 from the University of Texas at Austin and his M.S. and Ph.D. degrees in physics in 1965 and 1969, respectively, from the University of Illinois, Urbana-Champaign. His thesis research in impurities in silicon was the pioneering work that led to the widely known deep-level transient spectroscopy for characterizing impurities in semiconductors, which is still used today worldwide. In 1969 he joined Texas Instruments, performing research that resulted in the first demonstration of a metal-insulator-semiconductor structure in mercury cadmium telluride, and he helped lay the foundation for infrared detector development and products throughout the 1970s and 1980s. He and his group did pioneering work in charge coupled device memories, dynamic memory, silicon on insulator, and scaled metal-oxide-semiconductor (MOS) transistors. Today's industry-standard MOS transistor structure, used in countless

integrated circuit products worldwide, is based on seminal patents with sidewall oxides and self-aligned, silicided gates, sources, and drains patented by Al and his colleagues. They pioneered the charge coupled dynamic random access memory (RAM) cell, the Hi-C dynamic RAM cell, the grounded gate dynamic RAM cell, and leakage current analyses of dynamic memory structures. His patents on the Hi-C MOS dynamic RAM cell and the grounded gate MOS dynamic RAM cell have been used by most dynamic RAM manufacturers in the multibillion-dollar semiconductor industry. In 1978, Al was honored as a Texas Instruments fellow for his contributions to charge coupled devices and MOS dynamic memory technology. He was appointed associate director of the Very Large Scale Integration (VLSI) Laboratory in the Central Research Laboratories at Texas Instruments in 1980.

Al joined Motorola in July 1982, leading the start-up of the company's most advanced MOS integrated circuit manufacturing facility in Austin. In January 1984 he was promoted to director of the Advanced Products Research and Development Laboratory (APRDL), the laboratory with responsibility for the technological development of Motorola's new MOS memory, microprocessor, and logic products. A major endeavor in this responsibility was the move of APRDL from Phoenix to Austin and the start-up of a new R&D facility in 1984–1985. During this period, Al recruited me to Motorola to assist in this enormously challenging and complex program. I was drawn to join him in his vision of changing the organization, the technology, and the company. Al worked tirelessly to build the new R&D organization in Austin while keeping the Phoenix operation going. He had the highest expectations, continually striving to improve the ways in which we worked. Throughout this daunting project he exhibited the highest integrity and demanded the most of himself. During the simultaneous operation of the labs in Arizona and Texas, he was on a plane for 39 of 52 weeks in 1984, personally supporting both teams. He was appointed vice president of the technical staff of Motorola in February 1985.

Always drawn to education, Al joined the faculty of the electrical and computer engineering department at the University of Texas at Austin in July 1986, holding the Cockrell Family Regents Chair in Engineering. During 1987 he was in charge of the technical effort to successfully bring SEMATECH to Austin. Al played a major role in building the silicon-based education and research program at UT Austin to a level of national and international recognition. He established the silicon device fabrication laboratory in late 1987 with his students and his academic funds. This facility is used by most of the faculty and students in silicon-based materials, fabrication, and device research. Al initiated a research program with his students in MOS device modeling and analysis that is recognized worldwide.

Since starting at UT Austin, Al worked with the new faculty members as a mentor and collaborator to assist them in developing their graduate education and research programs. One of his colleagues at UT whom he closely mentored for many years reminisced that as an assistant professor he shared an office suite with Al. When he showed up for work the first day at UT at 8 a.m., Al was already hard at work in his office next door. Slightly embarrassed, his younger colleague would come in to work progressively earlier each day, but Al would always beat him to the office and welcome him with a wicked grin, a stack of papers to read, and countless ideas to try out jointly in the lab that day with graduate students. Over the next decade, the two of them progressed from mentor-mentee to the closest of friends and colleagues.

Al made many contributions to the Institute of Electrical and Electronics Engineers (IEEE) and to the Electron Devices Society (EDS). To name a few, he was a leader in the International Electron Devices Meeting, the largest and most prestigious meeting in the electronic devices industry, which he chaired in 1982. Additionally, he chaired the Symposium on VLSI Technology (1984) and the Semiconductor Interface Specialists Conference (1979)—heavily attended forums for the most advanced electronic devices research. He was associate editor of the IEEE's *Transactions on Electron Devices* between 1978

and 1991 and a member of the EDS Advisory Committee from 1982 to 1988. His contributions to industry and academia were well recognized with numerous awards. These included election to the National Academy of Engineering (1989); the IEEE Andrew S. Grove Award for outstanding contributions to solid state devices and technology (2001); the J. J. Ebers Award, the highest EDS award (1988); IEEE fellow (1983); Texas Instruments fellow (1978); the Semiconductor Research Corporation Technical Excellence Award (1992); the Billy and Claude Hocott Distinguished Centennial Engineering Research Award (1995); the University Leadership Award from the Semiconductor Industry Association (1997); the Electrochemical Society's Electronics Division Award (1997); the University of Illinois Alumni Award for Distinguished Service (1997); and election as one of the founding members of the Academy of Medicine, Engineering and Science of Texas in 2003. He held 38 U.S. patents.

Al was a respected mentor to many students, he had a strong sense of community responsibility, and he always had a clear vision for the future. He was a brilliant yet practical man, and, up until the end, his focus was on the well-being of his family. Al loved the outdoors and enjoyed being a part of the community of the Texas hill country. He was a member of the Stonewall Chamber of Commerce, the Stonewall Heritage Society, and the Fredericksburg Antique Tractor and Engine Club. He was also an active parishioner at both St. Mary's Cathedral in Austin and St. Francis Xavier Catholic Church in Stonewall. Throughout his many pioneering efforts, he was fortunate to have the unconditional love and support of his wife and soul mate, Judie. At their farm in Stonewall, they were able to integrate seamlessly into a very different world from that of Al's highly sophisticated and demanding professional life. Many of their rural neighbors honored Al at his funeral and had no idea that he was a man regarded internationally with such enormous professional respect. He was viewed as a neighbor who always gave of his own time and efforts to help make things better for his friends and his community.

Al is survived by his wife Judith; his son Edward and wife Anne; his son David and wife Sara and their children, Carsten and Kelsey; and his sister, Mary Jo Snider.

Professor Al F. Tasch, Jr., is sorely missed.