Mark B. Ketchen
Morris E. Leeds Award

Seiki Ogura
Morris N. Liebman Memorial Award

Robert W. Dutton
Jack A. Morton Award

Michiyuki Uenohara
Frederik Philips Award

extending operations research techniques in queuing theory and optimization to the design of computer and communication systems. At the University of Texas, he developed the idea of the "local balance" of queuing networks and (with other researchers) developed theories of product-form queuing networks. While at IBM's Thomas J. Watson Research Center, Yorktown Heights, N.Y., he collaborated on theories of approximations to product-form analysis, using analogies to electric circuits. He also developed methods for performance-modeling computer and communication systems.

Also at the University of Texas, he and a colleague pioneered the development of algorithms for distributed discrete-event simulation and developed a theory, on concurrent systems, used to design distributed algorithms systematically. At Caltech, Chandy has worked on tools and programming languages for distributed applications and on exploiting patterns of problem specifications to systematize program development. He got his Ph.D. in electrical engineering in 1969 from the Massachusetts Institute of Technology, Cambridge.

Morris E. Leeds Award
Mark B. Ketchen

"For leadership in the development of superconducting devices and technology for instrumentation applications."

Following four years as an officer in the U.S. Navy, teaching thermodynamics, nuclear physics, and nuclear reactor operations, Mark B. Ketchen (F) in 1977 joined IBM's Thomas J. Watson Research Center, Yorktown Heights, N.Y., to investigate the feasibility of a superconducting computer. Since then, he has held a variety of IBM research and research-management positions in solid-state science and technology. At present, he is director of physical sciences at the Watson center and is responsible for IBM's basic science strategy at research laboratories in Yorktown Heights, Almaden, Calif., and Zurich.

Ketchen received his Ph.D. from the University of California, Berkeley, for research on ultra–low-noise superconducting quantum interference devices (Squids), used in magnetic sensing applications requiring the highest sensitivity. Over the past 20 years, he and co-workers have pioneered innovative Squid designs, including the first fully integrated planar gradiometer, miniature susceptometers used in a number of physics experiments, and miniature magnetometers fabricated with a silicon-technology–compatible, planarized process. This process is now used in magnetic microscopy to study fundamental flux quantization effects in high-temperature superconductors.

Morris N. Liebman Memorial Award
Seiki Ogura

"For contributions to and leadership in the development of the lightly doped drain silicon field effect transistor (LDDFET)."

In 1971, Seiki Ogura (F) joined IBM Corp. in Raleigh, N.C., where he fabricated the company's first metal gate n-channel MOS field-effect transistor (MOSFET) depletion-load device. While there, he also worked on the design and fabrication of nonvolatile metal-nitride-oxide semiconductor (MNOS) memory and on power ICs. In 1978, he moved to the IBM facility in East Fishkill, N.Y., to work on advanced dynamic RAM technology. He has been a senior technical staff member at IBM since 1986.

Ogura recognized the possibility of making faster MOSFET devices by using a properly designed, self-aligned, lightly doped junction profile—the first lightly doped drain (LDD) MOSFET (or LDDFET), which has become widely used in the IC industry. The LDDFET has proven to be fundamental to the exploitation of submicron CMOS technology to make reliable, high-performance devices. Its availability extended the life of the 5-V supply standard for almost a decade and, more recently, of the 3.3-V standard as well.

Other accomplishments include the application of the sidewall spacer technique for manufacturing LDD structures, the invention and demonstration of double-implanted LDD devices, and advances in fully overlapped LDD structures. He has also made important contributions to bipolar-CMOS technology, including the development of npn and pnp bipolar transistors suitable for integration with FETs, high-performance BiCMOS, and a 256Mb-dynamic RAM. He is currently working on the development, design, and implementation of nonvolatile memory. Ogura received his Ph.D. in solid-state electronics from the University of California, Los Angeles, in 1969.

Jack A. Morton Award
Robert W. Dutton

"For seminal contributions to semiconductor process and device modeling."

On the faculty of Stanford University in California since 1971, Robert W. Dutton (F) is now a professor of electrical engineering, as well as research director at the Center for Integrated Systems. His research has centered on technology computer-aided design (TCAD)—modeling and computer aids for microelectronics technology, devices, and circuits. His research group pioneered the development of such process simulators as Suprem (versions 1, 2, 3, 3.5, 4, 4GS, and 007); the development of robust device simulators like Pisces; and the broad application of TCAD to modeling silicon and compound semiconductor technologies. A central theme of the TCAD work has been the development of accurate physical models across the hierarchy of levels, from process physics to compact models for circuit simulation.

Recently, Dutton has applied parallel computers to three-dimensional modeling. Currently, performance of billions of floating-point operations per second has been attained with 32-node parallel Pisces machines. His contributions to computational prototyping for ICs include virtual instrument algorithms, solid modeling techniques to create virtual ICs, and information models supporting TCAD integration. He obtained his Ph.D. in electrical engineering from the University of California, Berkeley, in 1970. He has co-authored several hundred journal and conference papers and has graduated more than four dozen Ph.D. candidates.

Frederik Philips Award
Michiyuki Uenohara

"For fostering cooperative R&D management and advancement of microelectronics technology."

After serving as a member of Nihon University's engineering faculty and as a research associate at Ohio State University's Electron Tube Laboratory in Columbus, Michiyuki Uenohara (LF) joined Bell Laboratories, Murray Hill, N.J., in 1957, undertaking research on microwave parametric amplifiers and microwave semiconductor devices.

In 1967, he returned to Japan and joined NEC Corp., Tokyo, where he managed the Electron Device Research Laboratory of the Central Research Laboratories, as well as several other labs and the Corporate Strategy Development Center. He became general manager of the Central Research Laboratories in 1971.

Five years later, Uenohara joined NEC's board of directors, and he managed corporate R&D and technology until taking his current post in 1989 as executive adviser of NEC. He also chairs the NEC Research Institute Ltd. in Princeton, N.J., and the NEC Research Institute of