

## Appendix C. Milestones

### C.1 New Faculty and Staff

**Dr. Narayana R. Aluru** was appointed as a research scientist in RLE's Circuits and Systems Group, effective August 1, 1996. Dr. Aluru had joined RLE as a postdoctoral associate in 1995. He is a graduate of the Birla Institute of Technology and Science (BE'89), the Rennsalaer Polytechnic Institute (MS'91), and Stanford University (PhD'95). Working with Professor Jacob K. White's group, Dr. Aluru will design and implement new serial and parallel simulation algorithms to aid in the design of micro-electro-mechanical systems.

**Dr. Jay N. Damask** (SB'90, SM'93, PhD'96) was appointed as a research engineer in RLE's Quantum-Effect Devices Group, effective May 10, 1996. Since 1991, Dr. Damask had previously been a graduate student and research assistant in RLE's Optics and Devices Group. In his new position, he will work with Professor Henry I. Smith's group on the design, materials development, lithographic fabrication, and component testing for all-optical networks.

**Dr. Gerhard de Lange** was appointed as a research scientist in RLE's Optics and Devices Group, effective July 1, 1996. A graduate of the Technical University of Eindhoven (BA'83) and the University of Groningen (MS'88, PhD'94), Dr. de Lange had previously been a postdoctoral associate in RLE since 1994. Dr. de Lange will work with Professor Qing Hu's group in the area of superconducting receivers to develop micromachined cryogenic and room-temperature millimeter-wave imaging arrays.

**Dr. Kung-Hau Ding** was appointed as a research scientist in RLE's Electromagnetics Group, effective June 1, 1996. Since 1993, he had been a postdoctoral associate in RLE. A graduate of National Tsing-Hua University (BS'78) and the University of Washington (MS'84, MS'85, PhD'89), Dr. Ding will conduct research in the field of microwave and millimeter-wave remote sensing of geophysical terrains.

**Dr. Paul Duchnowski** (SB'87, SM'89, PhD'93) was appointed as a research associate in RLE's Sensory Communications Group, effective January 1, 1996. Affiliated with RLE in various student and staff research positions since 1987, Dr. Duchnowski investigates phonetic speech recognition systems and the algorithms used to produce automatic speech cues in cued speech. His research is

related to the group's work on the development of aids for the hearing impaired and the deaf.

**Dr. Steven H. Isabelle** (PhD'95) was appointed as a research associate in RLE's Digital Signal Processing Group, effective July 1, 1996. Dr. Isabelle, a graduate of the Georgia Institute of Technology (BS'85, MS'86), has been affiliated with RLE as a graduate student and postdoctoral associate since 1987. His continued research will involve the development of advanced signal processing algorithms for wireless and wireline communications.

**Dr. F. Thomas Korsmeyer** (PhD'88) was appointed as a research engineer in RLE's Circuits and Systems Group, effective July 1, 1996. Previously, Dr. Korsmeyer had been affiliated with MIT's Department of Ocean Engineering since 1988, and had collaborated on research with Professor Jacob K. White's group in RLE on fast algorithms to solve complicated three-dimensional potential problems. A graduate of the University of Michigan (BA'73, BSE'79, MSE'80), his work will continue to support the group's research on adaptive gridding, with possible future work on order N methods applied to ocean engineering.

**Dr. Rajeev J. Ram**, Assistant Professor of Electrical Engineering and Computer Science, joined RLE's Optics and Devices Group in January 1997. Dr. Ram's research interests are focused on the quantum optics of microcavity lasers and on electron dynamics in quantum structures. A graduate of the California Institute of Technology (SB'91) and the University of California at Santa Barbara (SM/PhD'96), Dr. Ram has conducted a wide range of both theoretical and experimental research including the quantum statistics of microcavity excitons, electromagnetic models of distributed mirror cavities, process development for long-wavelength vertical cavity lasers, and femtosecond spectroscopy of microcavity polaritons.

**Jennell C. Vick** was appointed as a research specialist in RLE's Speech Communication Group, effective August 5, 1996. A graduate of Ohio University (BS'94) and Case Western Reserve University (MA'96), Ms. Vick will work with Senior Research Scientist Dr. Joseph S. Perkell to conduct research on speech motor control, which will also take into account the role of hearing.

**Dr. Pierre R. Villeneuve** was appointed as a research scientist in RLE's Surfaces and Interfaces Group, effective June 1, 1996. Dr. Villeneuve, a

graduate of the University of Ottawa (BS'88) and Laval University (PhD'93), had been a postdoctoral associate in RLE since 1994. In collaboration with Professor John J. Joannopoulos' group, he will investigate the theory of photonic bandgap materials and their application to the design of integrated photonic devices and semiconductor lasers.

**Dr. Thomas E.v. Wiegand** was appointed as a research scientist in RLE's Sensory Communication Group, effective July 15, 1996. A graduate of Franklin and Marshall College (AB'85) and Columbia University (BS'87, MA'90, MPhil'91, PhD'93), Dr. Wiegand joined RLE as a postdoctoral associate in 1993. His research on human-machine interfaces for virtual environments and teleoperator systems includes the development of a virtual workbench interface, as well as investigations into spatial knowledge acquisition and the effects of alterations in sensorimotor loops.

## C.2 Promotions

**Dr. Jesús A. del Alamo** was promoted to full professor in the Department of Electrical Engineering and Computer Science, effective July 1, 1997. Dr. del Alamo conducts research in RLE's Materials and Fabrication group that involves high-performance heterostructure field-effect transistors for telecommunications and studies of new quantum-effect devices based on one-dimensional heterostructures. A graduate of the Polytechnic University of Madrid (80) and Stanford University (MS'83, PhD'85), Dr. del Alamo joined the MIT faculty in 1988, after working at the Nippon Telegraph and Telephone Corporation in Japan. He is a former holder of the ITT Career Development Professorship, and a past recipient of the National Science Foundation's Presidential Young Investigator Award, the MIT Baker Award for Excellence in Undergraduate Teaching, and the MIT Edgerton Junior Faculty Achievement Award.

**Dr. Jacob K. White** (SB'80) was promoted to full professor in the Department of Electrical Engineering and Computer Science, effective July 1, 1997. Dr. White joined the MIT faculty and RLE's Circuits and Systems group in 1987. A former holder of the Analog Devices Career Development Chair and past recipient of the National Science Foundation's Presidential Young Investigator Award, his research focuses on the theoretical and practical aspects of numerical techniques applied to problems in circuit and device simulation, packaging, and micromechanical system design. In addition, his group investigates parallel computation and the interaction between numerical algorithms and computer architecture. Dr. White is a graduate of

MIT and the University of California at Berkeley (MS'83, PhD'85).

## C.3 Retirements

**Dr. Abraham Bers** (SM'55, ScD'59), Professor of Electrical Engineering and Computer Science, joined RLE in 1953 as a research assistant. He continued his work in the field of microwave electronics as a member of RLE's research staff, and was appointed to the MIT faculty in 1959. Professor Bers' recent research in RLE's Plasma Physics Group involves fundamental studies aimed at understanding transport in radio-frequency heating, current generation in toroidal plasmas, and related studies of induced stochasticity and chaos. He has served as president of the University Fusion Association and vice chairman of the American Physical Society's Division of Plasma Physics. He is a member of the American Association for the Advancement of Science and a fellow of the American Physical Society.

**Dr. Shaoul Ezekiel** (SM'64, ScD'68), Professor in the departments of Aeronautics and Astronautics as well as Electrical Engineering and Computer Science, came to RLE as a research assistant in 1965 to investigate gravitation research. Professor Ezekiel was appointed to the MIT faculty in the Department of Aeronautics and Astronautics in 1968, and the Department of Electrical Engineering and Computer Science in 1976. An authority on laser physics and engineering, Professor Ezekiel has made contributions to high-resolution laser spectroscopy and optical clocks. His research in the fields of lasers and optics include their application to atom-field interactions, laser spectroscopy, optical frequency-wavelength standards, and fiber-optic sensors. He also served as director of MIT's Center for Advanced Engineering Study from 1986 to 1995.

**Dr. Lawrence S. Frishkopf** (PhD'56), Professor of Electrical Engineering and Computer Science, has been affiliated with RLE's research in communications biophysics and auditory physiology starting in 1953. Professor Frishkopf was a research assistant and a research staff member in the Communications Biophysics Group, applying correlation techniques to the study of brain potentials. From 1957 to 1968, he was first a research fellow at the Rockefeller Institute and then a member of the technical staff at Bell Telephone Laboratories. He returned to MIT in 1968 as a member of the faculty and a principal investigator in RLE's Auditory Physiology Group. His recent investigations have involved measuring hair cell stereociliary tuft motions in relation to frequency selectivity in

alligator lizard cochlea. These studies have contributed to the understanding of acoustic analysis in more complex mammalian cochlea.

**Dr. Hermann A. Haus** (ScD'54), Institute Professor and principal investigator in RLE's Optics and Devices Group, has made prolific contributions to many emerging technologies in the field of optics. After coming to RLE as a research assistant in 1951, and joining the MIT faculty in 1954, his work focused on microwave tube and noise studies. In collaboration with the late Dr. Richard B. Adler (SB'43, ScD'49), he developed the circuit theory of linear noisy networks. His recent research includes quantum noise theory, wave-guide devices, all-optical switching, soliton systems, squeezed state generation, and ultrashort pulse lasers. Professor Haus has received numerous awards and honors, including the 1984 Award of the IEEE Quantum Electronics and Applications Society, the Optical Society of America's 1987 Charles Hard Townes Award, the 1991 IEEE Education Medal, and the Optical Society of America's 1994 Frederic Ives Medal.

**Dr. Nelson Yuan-sheng Kiang**, Eaton-Peabody Professor in the Harvard-MIT Division of Health Science and Technology. After graduating from the University of Chicago (PhB'47, PhD'55), Professor Kiang joined RLE's research staff in its Communications Biophysics Group. In 1956, he was the first appointment to the newly established Eaton-Peabody Laboratory at the Massachusetts Eye and Ear Infirmary, where he has also served as director since 1962. He was appointed to the MIT faculty in 1983, and has also held a faculty appointment in the Department of Otolaryngology at the Harvard Medical School. In addition, Professor Kiang has held research appointments at Massachusetts General Hospital and the Massachusetts Eye and Ear Infirmary. His research interests have centered on how the ear and the brain work together to produce auditory information. The basic knowledge found in this research is applicable to the diagnoses of hearing disorders and the treatment of otologic and neurologic diseases.

**Dr. John G. King** (SB'50, PhD'53), Francis L. Friedman Professor of Physics, came to RLE as a thesis student in 1950. Later, as a research assistant, he worked with Dr. Jerrold R. Zacharias on studies that led to the discovery of the atomic clock. Appointed to the MIT faculty in 1953, Professor King served as RLE's associate director from 1973 to 1976, and lectured in the Department of Physiology at Boston University's School of Medicine from 1976 to 1985. A leading proponent of educational innovation and reform, Professor King introduced several new teaching methods, including the concepts of concentrated study and corridor

labs. His recent research interests have focused on fundamental null experiments and surface studies in biology.

## C.4 Tenure

**Dr. Jacqueline N. Hewitt** (PhD'86), Associate Professor of Physics, was awarded tenure, effective July 1, 1996. Professor Hewitt is a principal investigator in RLE's Radio Astronomy Group and previously held the Class of 1948 Career Development chair from 1992 to 1995. Since joining the MIT faculty in 1989, she and her colleagues have pioneered research in the detection of gravitational lenses. Her work in this area uses gravitational lenses to probe dark matter and other cosmological parameters. She was the discoverer of the first "Einstein ring," an image that is produced when a lens is highly symmetric and almost perfectly aligned with its source. A graduate of Bryn Mawr College (AB'76), Professor Hewitt has received the 1993 Henry G. Booker Prize from the International Union of Radio Science and the American Physical Society's 1995 Maria Goeppert-Mayer Award.

## C.5 Awards and Honors

Dr. Uri Shaked, Professor of Electrical Engineering and Dean of the Faculty of Engineering at Tel Aviv University, has announced the establishment of the Bekefi Memorial Library. Following the generous donation of the scientific library of the late **Professor Emeritus George Bekefi** to the Faculty of Engineering at Tel Aviv University, Professor Shaked said that it will "be an active memory for a great scientist and a generous person." The library will be housed in the Department of Electrical Engineering-Physical Electronics' Student Microwave Laboratory. All books will be catalogued by Tel Aviv University's Library of Exact Sciences and Engineering and will be listed in its public computer network. Professor Bekefi, a plasma physicist in RLE and a member of the MIT physics faculty for 34 years, died August 17, 1995, following a battle with leukemia.

**Dr. Robert J. Birgeneau**, Dean of Science and the Cecil and Ida Green Professor of Physics, was awarded the 1997 Magnetism Award from the International Union of Pure and Applied Physics. A faculty member in RLE's Surfaces and Interfaces group, Dr. Birgeneau was cited for achievements in the field of magnetism and, in particular, for the identification of model magnetic systems and the experimental elucidation of their behavior by means of scattering techniques. His many important contributions to the field of condensed-matter physics

include investigations into the phase-transition behavior of novel states of matter and the microscopic physics of high-temperature superconductors. In collaboration with colleagues at the Brookhaven National Laboratory, Dr. Birgeneau has used neutron beams to probe the microscopic structure of matter, and has established the field of synchrotron x-ray scattering for studying magnetic phase changes. The Magnetism Award will be presented in July 1997, at the International Conference on Magnetism in Cairns, Australia.

The W.M. Keck Foundation has awarded MIT a three-year \$4.5 million grant to establish the W.M. Keck Foundation Neural Prosthesis Research Center. The grant, announced in December 1996, will enable scientists, engineers, physicians, and students from four Boston area institutions to collaborate on the development of neural prostheses that promise to improve function for deaf, blind, mute, and balance-impaired individuals. MIT, the Charles Stark Draper Laboratory, the Massachusetts Eye and Ear Infirmary, and the Harvard Medical School will work together in a broad area of bioelectronics research to develop shared solutions for new neural prosthetic aids.

**Dr. Donald K. Eddington**, principal research scientist in RLE's Auditory Physiology group, was named director of the new Keck Center. Dr. Eddington is also associate professor in Harvard Medical School's Department of Otology and Laryngology, and director of the Cochlear Implant Research Laboratory at the Massachusetts Eye and Ear Infirmary.

**Dr. John D. Joannopoulos** was appointed to the Francis Wright Davis Professorship in the Department of Physics. Dr. Joannopoulos, a principal investigator in RLE's Surfaces and Interfaces group, also received the 1997 David Adler Lectureship Award from the American Physical Society and the 1996 William Buechner Teaching Prize from MIT's Department of Physics. The APS cited Dr. Joannopoulos for pioneering the use of modern computational tools to calculate the properties of amorphous, crystalline, and photonic band-gap materials, and for excellence in lecturing, writing, and training students in this field. A researcher in the field of theoretical condensed-matter physics, Dr. Joannopoulos is recognized for developing numerous computational techniques to study complex solid systems. His recently co-authored book *Photonic Crystals: Molding the Flow of Light* addresses the discovery of photonic band-gap materials and their use in controlling the propagation of light.

**Dr. Alan V. Oppenheim** (SB/SM'61, ScD'64), previously Distinguished Professor of Electrical Engi-

neering, was appointed a Ford Professor in the Department of Electrical Engineering and Computer Science. He was named coholder of the chair along with Professor Barbara H. Liskov. Dr. Oppenheim, a faculty member in RLE's Digital Signal Processing group, was also named a 1997 MacVicar Faculty Fellow. MIT's MacVicar fellow program was established in 1991 in memory of Professor Margaret L.A. MacVicar, MIT's first dean of undergraduate education. The ten-year fellowship provides an annual scholar's allowance to assist fellows in developing ways to enrich the undergraduate learning experience. Dr. Oppenheim was cited for three decades of teaching and careful mentoring of MIT students, as well as his worldwide influence on electrical engineering education through his books and other teaching materials. He joins two other MIT faculty members, Professors John M. Essigmann and Lowell E. Lindgren, in receiving the fellowship.

Dr. Oppenheim. (SB/SM'61, ScD'64), also received the Bose Award for Excellence in Teaching on May 13, 1996. The annual award was established in 1989 by MIT's School of Engineering to recognize outstanding contributions by the faculty to undergraduate education. Professor Oppenheim has received many citations for his outstanding achievements in education, including the 1988 IEEE Education Medal and the 1984 IEEE Centennial Award. As a principal investigator in RLE's Digital Signal Processing Group, Professor Oppenheim's research focuses on speech, image, and geophysical signal processing. He is the coauthor of several widely used signal processing textbooks and the editor of several advanced books in the field.

**Dr. Gregory W. Wornell** (SM'87, PhD'91) was appointed to the Cecil and Ida Green Career Development Professorship in the Department of Electrical Engineering and Computer Science, effective July 1, 1996. In addition, Professor Wornell was also selected as the first recipient of the newly established Junior Bose Award for Excellence in Teaching. The award, presented by the MIT School of Engineering, complements the original Bose Award (see Dr. Alan V. Oppenheim, above), and recognizes the excellent contributions of junior faculty members. Professor Wornell, who joined the MIT faculty in 1991, was also recently named as an Office of Naval Research Young Investigator. The ONR program selects young scientists and engineers who show exceptional promise for doing creative research and teaching. A principal investigator in RLE's Digital Signal Processing Group, Professor Wornell's research includes signal processing, multi-user broadband and wireless communications, and the application of fractal geometry and nonlinear dynamics to these studies.

## C.6 In Memoriam

**Professor Emeritus Albert G. Hill**, 86, died of pulmonary disease on October 21, 1996, at his home in Needham, Massachusetts. Dr. Hill served as RLE's second director from 1949 to 1952. Born in St. Louis, Missouri, in 1910, Dr. Hill received his bachelor's degree from Washington University in 1930. After two years at Bell Telephone Laboratories, he returned to Washington University and received his master's degree in 1934. He completed doctoral studies at the University of Rochester in 1937.

Dr. Hill came to MIT as a physics instructor in 1937. He joined the MIT Radiation Laboratory in 1941, and became head of the laboratory's largest technical division. In 1946, he was appointed associate professor in the Department of Physics and associate director of the newly established RLE. He was promoted to professor in 1947, and named as RLE's second director in 1949. In 1952, Dr. Hill became the second director of MIT's Lincoln Laboratory. He was responsible for guiding laboratory personnel in the production of continental air defense systems using modern electronic devices, computers, and radar. These included the Semi-Automatic Ground Environment and Distant Early Warning systems. Returning to MIT in 1955, he helped establish both the SHAPE (Supreme Headquarters, Allied Powers Europe) Technical Center in The Hague and the NATO Communications Line.

In 1956, he worked in Washington as director for the Weapons Systems Evaluation Group, and the vice president and director for research of the Institute for Defense Analyses. He resumed teaching at MIT in 1959, and was appointed a lecturer in the Department of Political Science in 1965. In 1970, he was named as MIT's vice president for research, and became chairman of the board at Charles Stark Draper Laboratory in May of that year. He served at Draper until 1982. Dr. Hill served in roles that required both a technical background and administrative experience, and through these positions he contributed to the nation's defense-oriented research and development organizations. He was awarded the Presidential Certificate of Merit (1948), and Distinguished Civilian Service Medals from the Air Force (1955), the American Ordnance Association (1956), and the Secretary of Defense (1959).

Dr. Hill is survived by three nieces, a nephew, and nine grandnieces and grandnephews. Remembrances may be sent to the American Lung Association, 1505 Commonwealth Ave., Boston, MA 02135.

**Dr. Charles E. Molnar** (ScD'66), died of complications from diabetes on December 13, 1996, at his home in Sunnyvale, California. He was 61. Dr. Molnar was affiliated with RLE's Communications Biophysics Group from 1957 to 1965, and collaborated with other researchers at RLE and Lincoln Laboratory on the development of the Laboratory Instrument Computer (LINC) in 1962. The LINC, with its digital logic and stored program, is widely acknowledged to have been the first interactive personal computer. Earlier at RLE, Dr. Molnar also worked on the Average Response Computer (ARC-1), which was used in the late 1950s and early 1960s to average evoked responses of the brain to sensory stimuli.

A graduate of Rutgers University (SB'56, SM'57), Dr. Molnar was recognized for his work in self-timed computer system theory, which is used to design ultrafast computers. His contributions to the field of biomedical and general-purpose computing have also led to innovations in computer graphics, cochlear mechanics, and circuit design. After leaving MIT, Dr. Molnar joined the faculty of Washington University in St. Louis, where he worked from 1965 until 1995. He held various faculty appointments in the university's medical school, and its computer science and electrical engineering departments. In 1984, he established the Institute for Biomedical Computing at Washington University, and served as its director until 1991. Under his direction, the IBC coordinated computing research activities at Washington University's medical school and school of engineering and applied science. Dr. Molnar was a senior research fellow at Sun Microsystems in California at the time of his death, where he was working on advanced computer hardware design.

Dr. Molnar and his collaborator Wesley A. Clark (EE'55) received the 1983 Director's Award from the National Institutes of Health for their work on the LINC. Dr. Molnar also received the 1985 NIH Jacob Javits Distinguished Neuroscience Investigator Award.

Dr. Molnar is survived by his wife Donna Addicott Molnar (who worked in RLE from 1960 to 1963), and two sons, Steven and Christopher. An endowed fellowship has been established in Dr. Molnar's memory, and will be awarded annually to an entering graduate student in Washington University's Biological and Medical Engineering Program. Contributions may be addressed to: Charles E. Molnar Fellowship, Campus Box 1163, School of Engineering and Applied Science, Washington University, One Brookings D., St. Louis, MO 63130.

