chemically reacting systems. His early period studies include, in 1966, his first proof of convergence for the Chapman–Enskog method to solve the Boltzmann equation. That same year, he demonstrated that it is always possible to construct a symmetric stress tensor for systems with internal angular momentum; that result was subsequently rediscovered by others in materials science and solid-state physics. With Guillaume DeVault in 1965, he developed the statistical mechanics of viscoelasticity for a stressed medium and the corresponding positivity conditions for entropy production in such systems. These are but a few examples of his wide-ranging contributions to nonequilibrium statistical mechanics.

Al's work was characterized by sharp physical insight translated into careful mathematical analysis. Those characteristics are particularly well illustrated by the tight reasoning and its faithful mathematical presentation in his monograph, *Introduction to Non-Equilibrium Statistical Mechanics* (Prentice Hall, 1989). He continued his scientific work for most of the years following his retirement from Lehigh in 1991, when he became an emeritus professor of physics.

Al was a leader in the founding of the Sherman Fairchild Laboratory for Solid State Studies at Lehigh in the 1970s. He provided liaison with Lehigh physics alumni who had risen to senior executive positions of the Sherman Fairchild organizations. He oversaw the construction of the laboratory and presided over its first staffing.

With his wide disarming smile, Al was approachable and generous with his time to students and colleagues alike. He was a great sounding board. His uncanny ability to see the larger picture and to separate the inconsequential from the essential helped bring clarity to whatever issue was on the table. His comments, such as "hire

James Alan McLennan Jr

the brightest regardless of specialty" and "physics is waged globally," were often referred to as the "McLennan principles." Al believed that the oft-encited tension between teaching and research was ill-conceived: To him, research and teaching were a seamless continuum, one feeding the other.

Al remained an active bridge player and an avid gardener to the end, even after the loss of his wife, Betsy, five years before his death. His appreciation for music included operas and classical compositions; he sang in the men's choir Bethlehem Mannechor in earlier years. His devotion to his two children and his grandchildren led to his working with the Boy Scouts for years. His two sabbatical leaves, one at the University of Brussels in 1960–61 and the second at the University of Zürich in 1966–67, enriched him and his family with lasting interest in sensible living and adventures of outdoors and skiing.

Al's life will be an enduring testimony of what is really possible as an academic physicist. We take great satisfaction in having shared some part of our lives together as colleagues and friends.

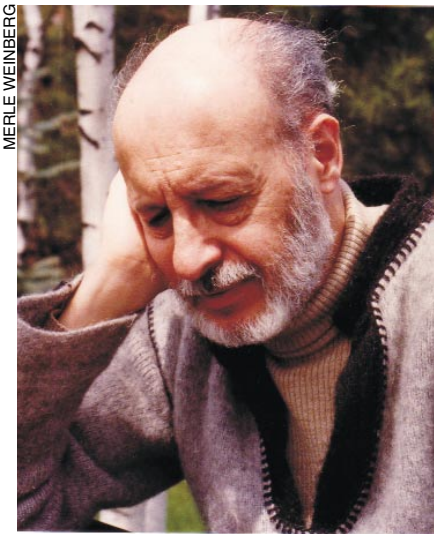
James W. Dufty
University of Florida
Gainesville
Yong W. Kim
Lehigh University
Bethlehem, Pennsylvania

Joseph Weinberg

Joseph Weinberg, the first William Rand Kenan Jr Professor of Science at Syracuse University and a major influence on the university's intellectual life, died on 22 October 2002 after a long and painful struggle with cancer.

The youngest of three siblings, Joe was born on 19 January 1917 in Maspeth, Long Island, New York, of Polish–Jewish immigrant parents. His father worked as a printing press engineer and a translator, and Joe enjoyed recounting how his father, after having claimed in a job interview that he knew Portuguese, had learned the language in a single night. Joe himself was a precocious youngster who enrolled in the Community College of New York at age 15. There, he was a classmate and friend of Julian Schwinger, with whom he discussed physics in preference to attending their physical education class. In consequence, both flunked the course and had to enroll at different times the next term. Joe graduated at age 19 with a BS degree in physics. Soon thereafter, he joined the graduate program at the University of Wisconsin–Madison, where he met his future wife, a Wisconsin farmer's daughter and an accomplished artist.

In 1938, Joe moved to the University of California, Berkeley, to do his PhD with his adviser, J. Robert Oppenheimer. The next several years were among the most exciting of his career. Besides Oppenheimer, he interacted with Wolfgang Pauli and conducted research in a broad



MERLE WEINBERG

Joseph Weinberg

spectrum of fields. He discovered, for example, that the vacuum does not evolve unitarily in the presence of a constant background electric field—an early indication of the constant creation rate per unit volume of electron–positron pairs, subsequently analyzed by Schwinger. Joe published in the *Physical Review* with Hartland Snyder and Leonard Schiff, and held the position of instructor at Berkeley from 1943 to 1947. The following year, he moved to the University of Minnesota as an associate professor of physics. Although he did not take to the cold and snow, he initiated influential work there, with Gerald Tauber, on the gravitational stability of white dwarf stars.

Joe's career at Minnesota was cut short when he fell victim to the McCarthyist repression of that era. Over a period of four years, he was accused of spying by the House Un-American Activities Committee (HUAC), threatened by the FBI, subpoenaed three times by federal grand juries, and indicted on charges of perjury. The Minnesota Board of Regents fired Joe on the recommendation of the university's president, James Morrill. Joe's trial ended on 5 March 1953; two charges were dropped and he was acquitted on a third. Nevertheless, he was not reinstated by Morrill.

After losing his position at Minnesota, Joe found work briefly with the *Physical Review*. He subsequently was employed as a research engineer with the House of Vision, an optical company for which he worked from 1953 to 1957, first in Chicago and then in Great Neck, Long Island. There, he, his wife, and his two sons enjoyed the mild weather and the beaches of Port Washington. He developed plastic eyeglass lenses and nonfogging visors for US Air Force fighter helmets. Years later, when the visor on an astronaut's space suit fogged up, NASA turned to Joe's work for the next generation of visors.

In 1957, Joe reentered the academic world as a member of the faculty of Western Reserve University and subsequently participated in its merger with the Case Institute of Technology. There he worked with Tauber on gravitational collapse and, together with Clyde Bratton and Amos Hopkins, made some of the earliest applications of nuclear magnetic resonance techniques to living tissues. Continuing his work on eyeglasses, he developed omnifocal lenses, the first progressive lenses commercially available in the US. In 1970, Joe went to Syracuse, where he was named the university's first William Rand Kenan Jr Professor of Science. He devoted considerable energy and imagination to undergraduate teaching. He also engaged in research in relativistic astrophysics, phase transitions, and the geometry of color-space. He retired and became professor emeritus in 1984.

Joe's awards included the Annual Award of the Gravity Research Foundation in 1963 and first prize in the American Association of Physics Teachers' Apparatus Competition in 1968.

Joe had an extraordinary presence. He had catholic interests and a deep knowledge, not just of physics in all its aspects, but also of music, literature, philosophy and, as it seemed, of all branches of human inquiry. He thought fast: During seminars, he seemed to be ahead of the speaker by 15 minutes, and we used to joke that if the speaker showed a tendency to narrow the gap, Joe would stop him with a question.

After retirement, Joe devoted himself to his beloved *Schola Cantorum*, a society dedicated to performing early European music. He served on the board, organized workshops, and raised funds. Until his death, he was steadily translating poetry from medieval Latin, Flemish, Provençal, and Catalan for the program notes that he wrote. Joe also continued his scientific research—on the shape of the ridges found on stalactites and icicles, on perfect numbers, and on mathematics teaching (reducing trigonometry to elementary algebra).

A. P. Balachandran
Rafael D. Sorkin
Syracuse University
Syracuse, New York ■