obituaries

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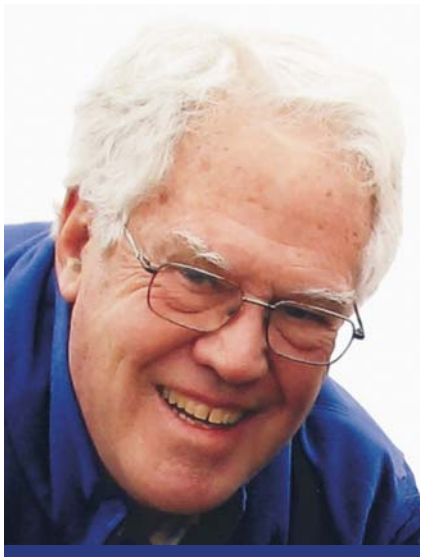
Edward Alan Knapp



Edward Alan Knapp

Experimental physicist, accelerator-technology innovator, entrepreneur, and respected administrator Edward Alan Knapp died at his home in Santa Fe, New Mexico, on 17 August 2009 after battling pancreatic cancer for more than a year.

Born 7 March 1932 in Salem, Oregon, Ed received an AB in 1954 from Pomona College. He went to graduate school at the University of California, Berkeley, where, as center for the Le Conte Hall Lions basketball team, his soft hook shot was always a threat. He earned his PhD in physics in 1958 for accurate measurements of the differential cross section for the photoproduction of pions from hydrogen at Berkeley's 340-MeV electron synchrotron. Although he worked in several areas of science, Ed was active in elementary particle physics throughout his career.

In 1958 Ed joined the magnetic confinement fusion program at Los Alamos National Laboratory (LANL). He loved the life, culture, and food of New Mexico and was a long-time devotee of the Santa Fe Opera. At every opportunity he and his family would go skiing, biking, hiking, or camping in the New Mexico mountains.

In 1962 Ed joined Louis Rosen as a founding member of the group that built the Los Alamos Meson Physics Facility (LAMPF; now the Los Alamos Neutron Science Center), an 800-MeV high-current accelerator for nuclear research and medical applications. Ed was responsible for the design and construction of the accelerator section. His team produced major innovations in particle accelerator design—primarily the side-coupled cavity system, which made possible ion-linacs such as LAMPF, and the post-coupled drift-tube linac.

Upon the successful completion of LAMPF, Ed assumed responsibility for its medical applications. He led a group of physicists in creating an extensive program of cancer radiation therapy that used exotic particle beams from the facility.

Ed had a continuing interest in applications of basic research. In 1968 he consulted with Varian Associates to design a compact, low-cost electron linac, based on his LANL research, for use in hospital cancer therapy. Today, variations of that design dominate cancer radiation therapy equipment. In 1968 he also cofounded SHM Nuclear, which built low-cost radiation therapy machines. Throughout most of his career, he served as a consultant to several firms, and he was on the boards of several startup companies, including Magnetic Pulse Inc, which made oil-well logging equipment, and International Isotopes Inc, a producer of accelerator-based isotopes.

After a 1972 sabbatical at CERN in Geneva, Ed led the LANL group that participated in the GAMS collaboration, which used Cherenkov calorimeters for exotic neutral meson spectroscopy at CERN and at the Soviet Union's Institute for High Energy Physics. He and team members were responsible for a low-noise analog adder trigger system that made the original and subsequent versions of the experiment possible.

In 1976 Ed founded, organized, and led the LANL accelerator technology division, devoted to research on the physics and engineering of particle accelerators. The division developed several new techniques that reduced the cost and increased the reliability of particle accelerators, including the first demonstration of the RF quadrupole for linacs.

Ed's low-key management style was to inspire, delegate to, and challenge his team members. Whenever they welcomed him home from his frequent travels, they joked that now they would have to deliver on more of his promises. Perhaps they were especially energized because Ed brought from CERN and shared with the division a newfound taste for espresso. He might leave a contentious meeting to get coffee and not return if he thought the participants should solve the problem without him.

In 1982 Ed was appointed LANL senior fellow; that same year he took leave to accept a presidential appointment as NSF assistant director for physics and mathematics and subsequently as NSF director, a post he held from late 1982 until mid-1984. During his tenure, the NSF budget grew by nearly 50%, and NSF established the young investigators program, supercomputer centers, and the engineering research centers.

Beginning in 1984 Ed was part of the group of LANL senior fellows that met regularly to conceive and found the Santa Fe Institute, a private, independent research institution that fosters multidisciplinary programs on the common fundamental principles in complex physical, computational, biological, and social systems. He became the first vice chair of the SFI board of trustees in 1985, was chair from 1987 to 1989, and served on the board until after his retirement.

From 1986 to 1989, Ed was president of the Universities Research Association, the consortium of more than 70 universities that operates Fermilab. Under his leadership, URA negotiated the Department of Energy contract for construction of the Superconducting Supercollider. In 1989 Ed returned to LANL to succeed Rosen as director of LAMPF; he served until 1991.

Ed was elected president of the SFI in 1991 and served until 1995. During

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Brian Mason
18 April 1917 – 3 December 2009

Konstantin Feoktistov
7 February 1926 – 21 November 2009

Sperry E. Darden
16 August 1928 – 23 October 2009

David Summers
2 August 1947 – 5 October 2009

Anthony Evans
4 December 1942 – 9 September 2009

Marcos Moshinsky
20 April 1921 – 1 April 2009

his administration, the institute's budget doubled, in part due to the cultivation of support from businesses and entrepreneurs, and SFI acquired its permanent campus. Under Ed's oversight, the institute experienced a burgeoning of innovative research and education programs, including adaptive computation, neurobiology, and research experiences for undergraduates.

After his retirement Ed continued to consult and publish on high-intensity linac design and applications, including the design of a detector for antipersonnel mines and linacs for food irradiation.

Ed had a rare combination of traits. He was a skilled and innovative scientist and technician who had strong leadership skills, an outgoing and cheerful personality, and a low-key management style that encouraged those who worked with him to give their best. One worked with Ed more than for him.

L. M. Simmons Jr
Aspen, Colorado

Hans Wolfgang Liepmann

Hans Wolfgang Liepmann, distinguished fluid dynamicist, outstanding teacher, and former director of the Graduate Aeronautical Laboratories at Caltech (GALCIT), passed away on 24 June 2009 at his home in La Cañada Flintridge near Pasadena, California.

Liepmann was born on 3 July 1914 in Berlin. After schooling in Germany, he moved to Istanbul, Turkey, where his father, a well-known physician, had accepted a professorship in order to escape the Nazis. A year later Liepmann went to Prague, Czechoslovakia, and quickly thereafter to Zürich, Switzerland. He obtained his PhD in physics from the University of Zürich in 1938 under Richard Bär. For his thesis, he used light-scattering methods to measure the speed of sound in liquid oxygen and other cryogenic fluids. Liepmann then accepted an invitation from Theodore von Kármán at Caltech and migrated to the US, joining GALCIT in 1939 just as the war that he had foreseen erupted in Europe. He took an immediate liking to Caltech and the US and stayed there for the rest of his life.

His research career at Caltech began with investigations of the stability of a laminar boundary layer. Liepmann confirmed Galen Schubauer's detection of previously controversial instability waves at the National Bureau of Standards (now NIST) and reported interesting new results on curved surfaces. Much later, in 1982, he and Dan Nosenchuk would show, in an early example of active flow control, how those Tollmien–Schubauer waves (as Liepmann insisted on calling them) could be suppressed by suitably phased forcing.

As World War II was ending, Liepmann went on to look at transonic and supersonic flow. Pictures he and his students Anatol Roshko and Satish Dhawan took in his laboratory in 1952 were among the first to clearly demonstrate the nature of shock–boundary layer interaction. His spectral theory of transonic buffeting was a seminal effort on a real aeronautical problem. His enduring interest in turbulent flows began with a study of mixing layers, followed by careful experiments by students such as Stanley Corrsin, John Laufer, Roshko, and Donald Coles.

With the advent of the space era, Liepmann's interests moved toward magneto-hydrodynamics and rarefied gas dynamics. In the early 1960s he worked with Moustafa Chahine and me on the structure of a shock layer, using the Bhatnagar-Gross-Krook model within the shock. That work provided the first solutions that spanned the whole range of flow regimes from the