To notify the community about a colleague's death, subscribers can visit http://www.physicstoday.org/obituaries, where they can submit obituaries (up to 750 words), comments, and reminiscences. Each month recently posted material will be summarized here, in print. Select online obituaries will later appear in print.

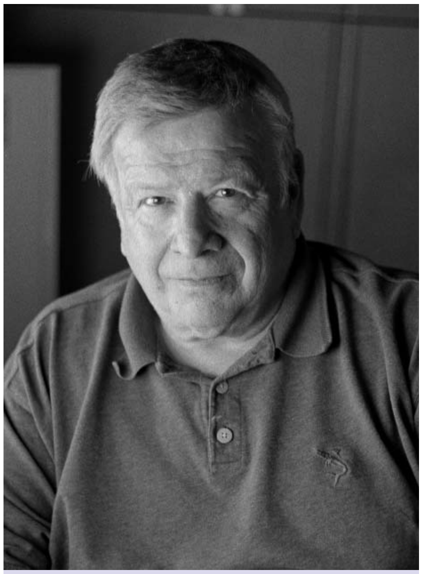
Gerald Stanford Guralnik

Gerald Stanford Guralnik, a pioneer of the theory of mass generation, which laid the groundwork for the standard model of particle physics, collapsed following a lecture to new graduates of Brown University's physics department on 26 April 2014. He died several hours later with Susan, his wife of 50 years, at his bedside. His passing in seemingly good health came as a shock to friends, family, and colleagues, who had expected to enjoy his kindness, wit, and keen physics insights for many years to come. Yet his death came in a setting that exemplified his entire professional life.

Gerry was born in Cedar Falls, Iowa, on 17 September 1936. As fellow Midwesterners, perhaps we were destined to meet and bond, as indeed happened when we were sophomores at MIT. Our relationship continued and broadened during our undergraduate years and beyond, even as he moved to Harvard University in 1958 for graduate work while I continued my studies at MIT.

Among the nonnegotiables in our schedules were the lectures of future Nobelist Julian Schwinger, with whom Gerry shared a deep fascination with upscale fast cars. Schwinger's perspectives on field theory would provide much of the foundation for the work Gerry and I later did together. Gerry completed his thesis in 1964 under the direction of Walter Gilbert, who went on to receive the Nobel Prize in Chemistry. The topic of his thesis—the photon as a symmetry-breaking solution to field theory—gave Gerry a perspective that guided his early career as well as our collaboration.

As our graduate studies came to an end, we published a paper together—on the subject of Regge poles—that happened to be the first for each of us. The following year we went to Imperial College London, where we joined forces with Tom Kibble, a recent addition to the staff, under the tutelage of Abdus Salam. Our collective attention immediately turned to one of the most baffling questions confronting particle theorists at the time—namely, how to



Gerald Stanford Guralnik

deal with the troubling issue of Goldstone bosons. Although spontaneously broken symmetry (SBS) solutions were coming to be viewed as a promising route to a unified electroweak gauge theory, the deadening hand of the Goldstone theorem blocked progress in that effort. Its prediction that zero-mass particles must occur in any manifestly covariant SBS theory is totally irreconcilable with the world of particle-physics phenomenology.

The approach we ultimately adopted was crucially based on the radiation gauge. It has the immediate advantage of evading the Goldstone theorem by giving up manifest covariance in favor of simple covariance. Schwinger's lectures on that particular gauge made us hopeful that it could be key to resolving the problem. Application of SBS indeed gave mass to the gauge fields, a result confirmed by the discovery of the W and Z bosons in 1983. Yet the Goldstone boson issue remained; only when we succeeded in displaying in full the banishing of the Goldstone boson from the physical spectrum did we release our results. Contemporaneous efforts in SBS theories by Robert Brout and François Englert and by Peter Higgs gradually caused us to realize that the delay necessitated by the Goldstone issue could loom large in the historical evaluation of those three overlapping but very distinct approaches to SBS. Yet 50 years later there is widespread misunderstanding of the Goldstone boson role, an issue that we recently addressed in what turned out to be Gerry's last published paper, "Where have all the Goldstone bosons gone?" (*Modern Physics Letters A*, volume 29, page 1450046, 2014).

The incorporation of SBS into mainstream particle physics led to many stunning experimental successes and the gradual emergence of the standard model. Eventually, the only thing preventing its general acceptance was the conspicuous absence of a predicted SBS

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Bruno Zumino
28 April 1923 – 22 June 2014
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Bertrand B. Aubrey
11 November 1933 – 21 May 2014
Warren Keith Sinclair
9 March 1924 – 14 May 2014
Floyd B. Humphrey
20 May 1925 – 8 May 2014
Colin Trevor Pillinger
9 May 1943 – 7 May 2014
James C. Ulwick
1 May 1924 – 17 April 2014
Victor Philippe Henri
14 August 1922 – 11 April 2014
Daniel S. Koltun
7 December 1933 – 9 April 2014
Göran K. Svensson
1938 – 22 March 2014
Richard L. Liboff
30 December 1931 – 9 March 2014
Martin C. Gutzwiller
12 October 1925 – 3 March 2014
Karl-Heinz Hermann Böhm
27 September 1923 – 2 March 2014
William A. Edelstein
21 November 1944 – 10 February 2014
John R. Huizenga
21 April 1921 – 25 January 2014
Ines Cifuentes
26 April 1954 – 16 December 2013
Paolo Budinich
28 August 1916 – 14 November 2013
Padma Kant Shukla
7 July 1950 – 26 January 2013
William Clayman
1930 – 2 June 2012
Robert J. Keyes
6 March 1927 – 25 April 2012

boson—the so-called God particle. Thus was conceived the Large Hadron Collider at CERN with its avowed goal of detecting the elusive boson. Success was announced at CERN on 4 July 2012, an event to which Gerry and I traveled together. (His comparison of the festive atmosphere there to a football game was widely quoted.) Meanwhile, the increasing awareness of work done in 1964 on SBS theory had led the American Physical Society to award the 2010 J. J. Sakurai Prize for Theoretical Particle Physics to Gerry and the five other authors of the three relevant SBS papers. (That sixfold citation remains a record for the society's awards.) In the many speaking invitations that Gerry later received, he frequently recalled a conversation he had had with Werner Heisenberg in 1965. In that exchange Gerry was told in no uncertain terms that SBS theories could not possibly succeed.

After leaving Imperial College London in 1965, Gerry briefly served as a research associate at the University of Rochester, where he and I continued our SBS collaboration. Then in 1967 he went to Brown, where he was the Chancellor's Professor of Physics. He continued to be a highly innovative and productive researcher and was an early advocate and user of computers in particle-physics applications. There again he showed his willingness to depart from the orthodoxy of the times, which was long resistant to the introduction of computer technology into theoretical particle physics. He cast a long shadow on the computer systems at Los Alamos National Laboratory, where he spent many years as a consultant and staff member, and at Brown. To the end he continued his collaborations, including with his son, Zachary, who was inspired by his father's groundbreaking work to pursue the study of particle physics.

Carl R. Hagen
University of Rochester
Rochester, New York

Andrew Marienhoff Sessler

Andrew Marienhoff Sessler, visionary former director of Lawrence Berkeley National Laboratory (LBNL), one of the most influential accelerator physicists in the field, and a human-rights activist, died on 17 April 2014 from cancer.

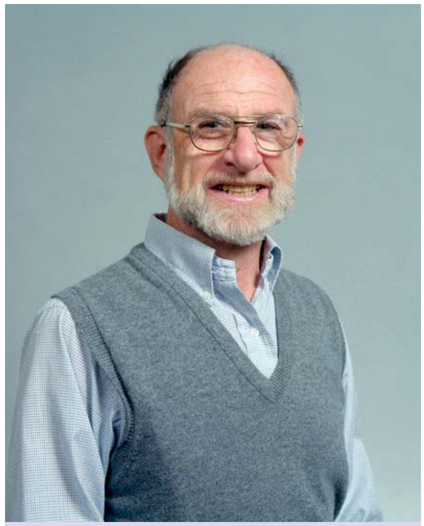
Born on 11 December 1928, Andy grew up in New York City. He was one of the first Westinghouse Science Talent Search finalists, for which he visited the White House as a high school senior in 1945. He enrolled at Harvard University just as World War II ended. He received a BA in mathematics, then went to Columbia University and earned a PhD in physics in 1953 under Henry Foley. After an NSF postdoc—in the first group ever awarded—at Cornell University with Hans Bethe and a stint on the faculty at the Ohio State University in 1954–59, Andy joined the Lawrence Radiation Laboratory—as LBNL was then called—in 1959; he spent the remainder of his career there.

Andy left his mark in several areas of physics, including nuclear structure theory, elementary-particle physics, and many-body problems. His 1960 paper with Victor Emery is generally acknowledged, along with a paper from a competing group led by Philip Anderson, as the first to predict the superfluid transition of helium-3.

His interest in accelerator physics began in the summer of 1955 when Andy was invited by Donald Kerst to join the Midwestern Universities Research Association study group. MURA researchers were working to host a multi-GeV proton accelerator project in the Midwest based on a novel accelerator scheme called the fixed-field alternating gradient. Although the project did not materialize, their R&D achievements profoundly transformed accelerator design from an intuitive art to a rigorous scientific discipline centered around beam physics.

In collaboration with Keith Symon, another MURA member, Andy studied the RF acceleration process and, for the first time in accelerator research, employed the full power of Hamiltonian dynamics and computer simulation, using the most powerful computer at that time, ILLIAC. They discovered a method to produce intense circulating beams by "stacking," repeatedly collecting the injected beam into a phase-space "bucket" and raising its energy. But if the intensity gets too high, beams in general become unstable, rendering them useless. In collaboration with several colleagues, Andy showed that high intensities can still be maintained by carefully controlling the beam environment. Those discoveries made high-luminosity proton colliders feasible; the most famous implementation, the Large Hadron Collider, recently discovered the Higgs particle.

After being at LBNL for several



LAWRENCE BERKELEY NATIONAL LABORATORY

Andrew Marienhoff Sessler

years, Andy became interested in the impact of science and technology on society. He helped usher in a new era of research on energy efficiency and sustainable energy technology and was instrumental in building the research agendas in those areas for the Atomic Energy Commission (AEC) and later the Department of Energy.

In 1973 Andy was selected as LBNL's third director. His first act was to establish the energy and environment division, with Jack Hollander as director, and the two men started more than 50 research projects in the first year. The division initiated many major research programs in such fields as air-pollution chemistry and physics, solar energy technology, energy economics and policy, and internationally prominent energy efficiency technology under the guidance of Arthur Rosenfeld. Andy supported the development of the nation's largest geothermal research program, which led to the lab's establishing one of the nation's leading Earth-sciences research divisions.

Stepping down from his post as LBNL director in 1980, Andy returned to his first love—research. He began work in earnest on a new area of accelerator physics: the generation of coherent electromagnetic waves through the free-electron laser (FEL) interaction.

Together with Donald Prosnitz, Andy proposed in 1981 a high-gain FEL amplifier for high-power millimeter-wave generation. The group Andy assembled to perform and analyze the successful 1986 millimeter FEL experiment also explored FELs at x-ray wavelengths. The researchers found that the x-ray beam being amplified in a high-gain FEL does not diffract but stays