required him to get blood transfusions every few weeks. Throughout these difficult times, he "raged against the dying of the light," to paraphrase the poetry of Dylan Thomas; he traveled incessantly, he continued to do science with laboratories and ongoing projects at Penn and the University of Texas at Dallas, and he exerted his leadership in two institutes named in his honor, the one in New Zealand and another in China.

Alan was famous for his rendition of a Maori war dance. As he told the story, he and his sports teammates performed this fierce dance with associated shouting in the Maori language to frighten opponents. And he delighted in performing it at conference banquets. I will always remember his performance in the wee hours after the Nobel award ceremony and the banquet and ball. We had all moved to a new venue where the university students put on a show, full of fun and spiced with sarcasm. At just the right moment, Alan got up, walked onstage, and did his Maori war dance, as shown in the accompanying photo.

Alan MacDiarmid had a full life in every respect. Those of us who knew him well will truly miss him.

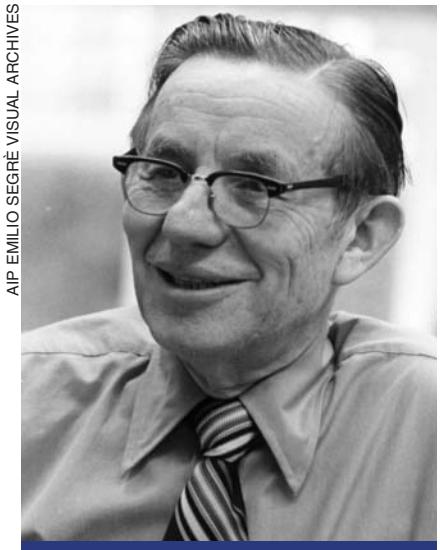
Alan J. Heeger
University of California, Santa Barbara

Sidney Millman

Sidney Millman died on 11 November 2006 in Danville, California, after a distinguished career as a scientist, administrator, and educator.

The son of a blacksmith, Sid was born in 1904 in David-Gorodok, Russia. After he survived the White Russian army's brutal treatment of Jews, members of his family who had already emigrated to the US brought him to this country in 1922. Sid attended tuition-free courses at the City College of New York at night while working for his brother as an ironworker by day.

In 1931 Sid graduated from CCNY and entered Columbia University to satisfy the one year of graduate study required to become a high-school teacher. Faced with no job openings, he stayed at Columbia. After accepting I. I. Rabi's invitation to join his group, Sid quickly constructed a working beamline and was able to measure the spin and magnetic moment of potassium-41 using the theory of Gregory Breit and Rabi. For this he obtained his PhD in 1935 and continued measuring nuclei of the other alkali metals. To investigate other nuclei such as indium-115, he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Sidney Millman

and Jerrold Zacharias rebuilt the beamline so that it could operate at higher temperatures and magnetic fields. Norman Ramsey recalls that during this "indium summer" (Zacharias's terminology) they could not locate a persistent leak. In desperation, Zacharias leaned against the wall and asked, "If I were a vacuum system, where would I leak?" Sid just kept looking and eventually found and fixed the leak.

C. J. Gorter, during a 1937 visit to Columbia, told Rabi of his unsuccessful attempts to detect nuclear transitions in solids by observing the heating at the resonance induced by an applied transverse RF field. Rabi (and perhaps Gorter independently) recognized the value of the RF field and invented the method of molecular beam magnetic resonance. As Ramsey further notes, both Sid and Zacharias were creative scientists and superb experimentalists and, within a short time, were able to reconfigure the indium beamline and for the first time observe nuclear magnetic resonance. For this work, which was published in 1938 by Rabi, Zacharias, Sid, and Polykarp Kusch, Rabi was awarded the Nobel Prize in Physics in 1944.

Returning home from the lab late one night on the subway, Sid realized that a puzzling small asymmetry found in the resonance curves was due to the RF coil. Back in the lab the next morning, he demonstrated that the asymmetry provided a way of revealing the previously undetermined sign of the nuclear moment. From his many subsequent publications and from the many comments I have heard from people in the know, I believe Sid's contributions did not receive the full credit they merited. Sid's modest, unassuming nature undoubtedly contributed to this oversight.

During World War II, Sid remained at Columbia, where he invented a configuration of the rising-sun magnetron that lowered its losses and enabled the development of more precise radar. Sid came in contact with Bell Labs scientists while they were incorporating the rising-sun magnetron into an advanced radar system Bell was preparing for use in the invasion of Japan. After the war he received an offer to join Bell Labs from James B. Fisk, then assistant director of physical research. At that time it was not the common practice of Bell, or other industrial labs, to hire Jews. I believe Sid was only the second Jewish scientist to become a member of Bell Labs, and the first in physical research. His hiring indicates how highly he was regarded by his peers, as well as Fisk's astuteness in breaking down barriers.

In 1952 Sid was appointed director of physical research. He was responsible for furthering the enlightened policies that enabled Bell to become the premier world center of solid-state physics research. I and other subdepartment heads at the time—Conyers Herring, Philip Anderson, Peter Wolff, Albert Clogston, and Homer Hagstrum—appreciated the unobtrusive way in which Sid nurtured the creative environment. In his allied role as director of university relations, he helped establish a "win–win" situation in which senior scientists left Bell to bring newly discovered science to major research universities while bright young graduates came to Bell as postdocs and junior staff members.

After his retirement in 1973, Sid edited several volumes of *A History of Engineering and Science in the Bell System*, a labor of love that describes the contributions in communications and physical sciences made at Bell Labs from 1925 to 1980. He served as secretary of the American Institute of Physics from 1974 to 1980 and continued to play an active role in physics education. He obtained an NSF grant, administered through Rutgers University, to bring exciting scientific developments into high schools. He prevailed on friends and colleagues to design modules based on modern ideas in condensed matter—magnetism, silicon, superconductivity, and optics—which were distributed and explained in summer workshops. This successful, farsighted program lasted five years.

In 1993 Sid and his wife, Dorothy, moved to Walnut Creek, California, to be closer to their son, Michael, and his

family. They reached out in a new direction and established the Millman Respite Center at the Contra Costa Jewish Community Center; the respite center serves seniors of all faiths and backgrounds who suffer from Alzheimer's disease and similar disorders. A characteristic Millman touch is that the center also offers an ongoing educational program for its caregivers.

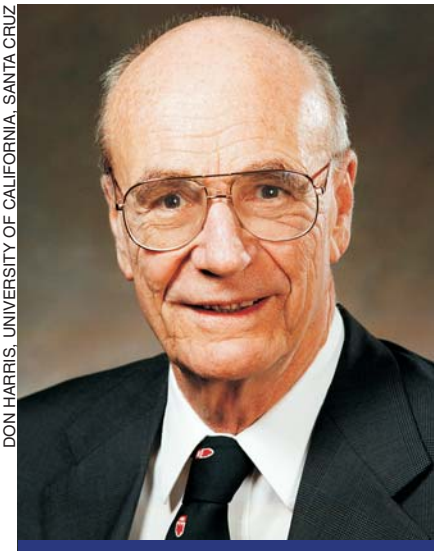
Sid enjoyed a long, productive life filled with science, music, and his family; he and Dorothy loved the opera and had Metropolitan Opera season tickets for more than 50 years. He had a profound appreciation of this country, which took him in and gave him an education that enabled him to realize his potential as a physicist. With his keen intellect and modest and gracious manner, Sid left the world a better place.

Theodore H. Geballe
Stanford University
Stanford, California

Donald Edward Osterbrock

The worlds of observational astrophysics and 20th-century astronomy history lost a leading figure on 11 January 2007 when Donald Edward Osterbrock died suddenly of a heart attack while walking near his office at the University of California, Santa Cruz. He was respectfully called "DEO" by his former students and postdocs and "Don" by his many friends. His life spanned the period from when astronomy was a small discipline pursued by a few hundred practitioners and the most powerful telescope was the 100-inch at Mt. Wilson, California, to our modern era, with more than 7000 members of the American Astronomical Society (AAS), giant ground-based telescopes, and space telescopes that observe the universe from x-ray energies through the far infrared.

Don was born in Cincinnati, Ohio, on 13 July 1924 into a family of German descent. His father, who dropped out of high school to work full-time, eventually became a professor of electrical engineering at the University of Cincinnati. Drawn into the vortex of World War II soon after graduating from high school, Don attended courses and was trained by the US Army at the University of Chicago, then served in the South Pacific. After being discharged, he returned to Chicago, where he received a BS in physics in 1948, an MS in astronomy in 1949, and a PhD in astronomy in 1952.



DON HARRIS, UNIVERSITY OF CALIFORNIA, SANTA CRUZ

Donald Edward Osterbrock

At the university's Yerkes Observatory, he worked with some of the greats of the time—Bengt Strömgren, W. W. Morgan, and his PhD thesis adviser, Subrahmanyan Chandrasekhar. As a postdoc at Princeton University, he solved the conundrum of the inner structure of the ubiquitous red dwarf stars.

He moved to the young astronomy department at Caltech in 1953 and