

a struggle for survival. He convinced the US government to support some of the best groups, and made many trips to Moscow and St. Petersburg, delivering cash and enjoying his interactions with the local intelligentsia. For this and many other accomplishments, he was honored by being elected as a foreign member of the Russian Academy of Engineering Sciences in 1997.

His many friends around the world miss him dearly.

**HYATT GIBBS
PIERRE MEYSTRE
EWAN WRIGHT**
*University of Arizona
Tucson, Arizona*



WILLIAM PHELPS ALLIS

William Phelps Allis

William Phelps Allis, an emeritus professor of physics at MIT, died of pneumonia on 5 March in Cambridge, Massachusetts. An authority on electrical discharges in gases, Allis was a pioneer in establishing the modern theory of plasmas.

Will was born on 15 November 1901 in Menton on the French Riviera. His grandfather had been a founder of the Allis-Chalmers Co of Milwaukee. His father had attended MIT and had founded the Lake Laboratory of Milwaukee for the comparative anatomy study of fishes—a laboratory he subsequently moved to Menton after a protracted illness. In Menton, young Will was educated at home by private tutors, and in 1920 he entered MIT as a sophomore. He received his BS in 1923 and his MS in 1924—both in physics. After returning to France for his doctoral thesis work, he was awarded a *Docteur des Sciences* degree by the University of Nancy in 1925.

In 1925, Will returned to MIT as a research associate in physics. He spent a year (1928–29) studying relativity with Oswald Veblen at Princeton University. Veblen also taught him rock climbing at Chamonix in the French Alps.

In 1930–31, he studied electron diffraction by atoms under Arnold Sommerfeld in Munich. He joined the MIT physics faculty as an instructor in 1931, becoming an assistant professor in 1934, associate professor in 1940, and a full professor in 1950.

Will's early (1931) theoretical work explained the Ramsauer effect. He also (in 1935) pioneered the systematic use of distribution functions and the Boltzmann equation for studies of electron and ion dynamics in gases. In 1940, he embarked on war-related research at the MIT

Radiation Laboratory, where his work on the magnetron gave insight into the operation and efficiency of this important microwave oscillator for radar. Having transferred to the Pentagon in 1942, he left the army in 1945 as a lieutenant colonel and with a Legion of Merit.

After the war, he returned to MIT and was instrumental in establishing MIT's leadership in plasma physics. In 1954, in collaboration with David J. Rose, he developed the theory of transitional ambipolar diffusion of charged particles in gases. His landmark review in the *Handbuch der Physik* (1956) contained the seeds of modern plasma physics and showed the successful use of the Boltzmann equation in understanding experiments (such as those by Sanborn C. Brown and colleagues) on microwave-driven electrical discharges in gases. Addressing plasma physics problems in fusion research, Will contributed importantly to the understanding and classification of wave propagation in an anisotropic, magnetized plasma through what is now known as the CMA (Clemmow, Mullaly, Allis) diagram of the different shapes that an index surface can have in such plasmas.

In 1952, he joined the toroidal plasma fusion research effort of James Tuck at Los Alamos, and was a member of the US delegation to both the first (1955) and second (1958) Geneva Conferences on Peaceful Uses of Atomic Energy. He liked to recall that at that time he was also on a bicycle tour of Europe with his family and friends, and used to arrive at the conference on his bike among the big black Cadillacs, Mercedes, and Zises. Later on, in Paris, when he became NATO's assistant secretary

general for scientific affairs (1962–64), he would also arrive at meetings on his bike and ask the porters to park it for him. The French government bestowed on him the *Legion d'Honneur* (1968) and later further honored him by making him an *Officier* of the *Legion d'Honneur* (1976).

In appreciation of his scientific contributions, the biannual Will Allis Prize of the American Physical Society was established in 1989. The purpose of the prize is to recognize and encourage research into the microscopic and macroscopic behavior of ionized gases.

Throughout his career and into his old age, he enjoyed mountain climbing, skiing, white-water canoeing, and waltzing. He rowed down the Yukon River, and went over the Andes into the rain forest of Ecuador. With his resounding, infectious laugh, he could cheer up colleagues who were stressed by research, physical activity or both, and was a valued friend. The fortunate ones among us who worked with him—and always had a hard time keeping up with him—will always remember and miss him.

**ABRAHAM BERS
HERMANN A. HAUS**
*Massachusetts Institute of Technology
Cambridge, Massachusetts*

Robert Sears Jr

Robert Sears Jr, the chair of the department of physics at Austin Peay State University in Clarksville, Tennessee, and president-elect of the American Association of Physics Teachers (AAPT), died suddenly while riding an exercise bicycle at his home in Clarksville on 14 April.

Born in Green Hill, Kentucky, on 13 June 1941, Bob attended Western Kentucky State College before transferring to Centre College of Kentucky, where he earned his BA in physics in 1963. His PhD in experimental high-energy physics was granted by the University of Colorado in 1968.

After graduation, and having chosen a career teaching physics and astronomy, Bob joined the faculty at Austin Peay State University as an assistant professor. He became an associate professor in 1971, department chair in 1977, and a full professor in 1978.

AAPT was a very important component of Bob's career, as reflected in his having attended every summer and winter meeting for the last 22 years. He was a founding member of