

Melvin Slein Freedman

Melvin Slein Freedman, a senior physicist at Argonne National Laboratory (ANL), died in Downers Grove, Illinois, on 18 April after a two-year struggle with cancer.

Freedman was born in Chicago on 24 May 1915. He received his bachelor's degree in 1936 and his PhD in physical chemistry in 1942—both from the University of Chicago.

Staying at Chicago, in 1943 Freedman joined the university's metallurgical laboratory as a physical chemist. The lab was then devoted largely to solving problems in the production of plutonium for the Manhattan Project. He was a founding member of the Atomic Scientists of Chicago, a group that played a major role in ensuring civilian control of nuclear weapons production and nuclear power. That group evolved into the Federation of American Scientists.

After World War II, the metallurgical lab became ANL, which Freedman joined. There, he began work on analyzing the spectrum of beta particles, which was probably his most important contribution to physics. He designed and built a beta spectrometer, which combined a high resolution of beta energies with a large acceptance angle in a unique way. With that instrument, and in collaboration with Fred Porter, Frank Wagner and others, Freedman made numerous contributions to solving problems in nuclear and atomic physics. The results from this instrument were particularly useful for working out the decay schemes and energy levels of a number of transuranic elements. It was also used in finding the K binding energy in fermium, which provided an interesting test of nuclear theory.

In 1980, Freedman turned his attention to two long-term projects, which may potentially be of great importance, but are still in limbo. He devised a scheme for detecting the solar neutrino flux for the past few million years by looking for lead-205 produced from tellurium-205 by neutrino capture. To be realized, this technique requires a thallium deposit, with minimal lead, a mile or more beneath Earth's surface. Unfortunately, such a deposit has yet to be found.

The other project is a scheme for measuring the electric dipole moment of the neutron—a popular test of time reversal. Freedman suggested that this test could be done using neutron interferometry in an interferometer in which the two paths would be distinguished by their spin rather than by their geometry. Though expensive, the

experiment should be feasible.

Freedman was intelligent, witty, energetic, inventive and utterly honest. His dedication to his work was such that he was working regularly at ANL until the day he died. He will be missed.

ROY RINGO

*Argonne National Laboratory
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Thomas Andrew Potemra

Thomas Andrew Potemra, a leading researcher in the study of the electric currents that flow in space around Earth, died on 3 April 1998 in Washington, DC, of complications following heart surgery.

Born on 23 October 1938 in Cleveland, Tom graduated from Case Institute of Technology in 1960, earned a master's degree in electrical engineering from New York University in 1962 and a PhD in electrical engineering from Stanford University in 1966.

In 1965, he joined the research center of the Johns Hopkins University Applied Physics Laboratory (JHU/APL), where he remained throughout his career. He transferred from the research center to the space physics group of the JHU/APL space department in 1974 and became its supervisor in 1981.

Tom's thesis included one of the first computer simulations of ionospheric radio propagation. His early work at JHU/APL, frequently in collaboration with his friend and mentor Al Zmuda, studied VLF (very low frequency) phase shifts and riometer absorption at high latitudes. Those observations led to new ionospheric models. Tom then extended these techniques to the study of energetic electrons that precipitate into the mid-latitude ionosphere and the relationship between VLF phase shifts and atmospheric planetary-scale waves.

In 1974, when Zmuda died, Tom assumed leadership of scientific studies with the TRIAD satellite's magnetometer. Working with Takeshi Iijima and a number of other researchers, he established the occurrence patterns of the auroral-zone currents (called Birkeland currents) that link the polar ionosphere to Earth's magnetosphere. This seminal work helped establish the current paradigm, long advocated by Hannes Alfvén, that underlies much of present magnetospheric research. As the principal investigator for magnetometer instruments on many subsequent spacecraft, Tom helped to develop a firm experimental foundation for current models of the ionosphere-magnetosphere system.



THOMAS ANDREW POTEKRA

Tom's contribution to space physics went far beyond his own individual research. He led the very active JHU/APL space physics group during a period in which it grew and fissioned three times to become a cluster of four groups (each of 25–60 people) dedicated to basic research, space instrumentation and scientific programming. Tom's energy, infectious enthusiasm and love of science inspired all who knew him and established an atmosphere in which basic research flourished. He was a mentor, a partner and a friend to researchers at JHU/APL and around the world.

Tom had many science-oriented avocations, but perhaps the most notable was rooted in his interest in the history of geomagnetism and auroral science and the pioneers who established these fields. He studied the journals and early published works of explorers and became—as one example—an expert on the Arctic explorer Fridtjof Nansen. He wrote articles and presented numerous public lectures on the lives of Nansen, Olaf Birkeland, Alfvén and others.

Tom was unselfishly devoted to the vitality of space science. In 1985–86, while on leave from JHU/APL, he served as a senior policy analyst in the US Office of Science and Technology Policy, where he contributed to the development of national policy in civilian space science. A member of many advisory panels and committees, he was always a voice of reason and unity, always looking toward the future. In recent years, Tom worked on developing and nurturing a new generation of NASA space science missions, such as TIMED and STEREO, which are in line with the evolving NASA emphasis on smaller, faster and more innovative programs.

Tom was wholeheartedly and deeply involved in every aspect of life—his

family, church, science and community of scientific colleagues. He is deeply missed by all who knew him.

RICHARD W. MCENTIRE
LAWRENCE J. ZANETTI
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Ragnar Oswald Rollefson

Ragnar Oswald Rollefson, an emeritus professor of physics at the University of Wisconsin—Madison, died in Madison on 5 May, after a long illness.

Born on 23 August 1906 in Chicago, Rollefson grew up in Superior, Wisconsin, where his father was a physician. After attending Superior Teacher's College in 1924, he obtained the rest of his formal education at Wisconsin, where he earned a BA and MA in physics in 1926 and 1927, respectively. It was there, too, when he was only 23 years old, that he received his PhD, having done a thesis on experimental molecular spectroscopy under Charles Mendenhall.

Rollefson's subsequent academic career was spent entirely at Wisconsin. In 1947–51, 1952–56 and 1957–61, he also served as department chairman, in which post he made it a point to know personally every one of the department's almost 100 graduate students.

Rollefson was famous in the department for the quality of his instruction—especially in elementary physics and in the heat and light labs. He rejuvenated the elementary labs and wrote a challenging “no cook book” type of lab manual that was used there for several decades. The university honored him with a distinguished teaching



RAGNAR OSWALD ROLLEFSON

award in 1972. He retired as an emeritus professor in 1976.

Rollefson interrupted his long career at Wisconsin several times to serve his country in both war and peace. During World War II, he took the first of his many leaves of absence from Wisconsin to work on radar at MIT from 1942 to 1945. In 1946, he was chief scientist at Naval Research Laboratory field station in Boston, and, in 1951–52, he was associate director of Project Charles at MIT's Lincoln Lab. In 1956–57, he served as chief scientist of the US Army in Washington, DC, and was awarded the Presidential Certificate of Merit.

From 1957 to 1960, Rollefson served as acting director of the Midwest Universities Research Association (MURA), which had been formed to design and promote a high-energy particle accelerator for the Midwest. MURA made many contributions to accelerator design, but it influenced the choice of a Midwest location for Fermilab only indirectly.

In 1963, he directed the US State Department's office of international scientific affairs. He wrote many reports and articles on the military applications of science, including major parts of the Overhage committee report for SHAPE and the 1957 article “Why so Many Missiles?” in the *Bulletin of the Atomic Scientists*.

At the University of Wisconsin, by law and tradition, faculty duties are threefold: teaching, research and public service. Rollefson made important contributions in all three categories. His success as a teacher and his substantial public service are outlined above; as a researcher, he published many articles on molecular structure and trained six PhD students in experimental molecular spectroscopy.

The essence of Rollefson's success as teacher and administrator lay in his superb judgment, quickness to grasp and thoroughly understand a problem and his ability to explain complicated matters in simple terms. But his warmth and compassion were also important. His door was always open; students and others felt welcome to discuss even personal problems with him. His honesty and integrity were always evident. As one of his colleagues put it, “For Rollie not to be reasonable was simply not feasible.”

When he learned of his good friend Rollefson's appointment as science adviser to the US State Department, Eugene Wigner told me, “Now I can sleep better at night.”

HUGH T. RICHARDS
University of Wisconsin—Madison ■

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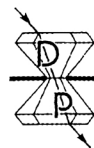


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