sense and intellectual leadership. They could count on Harry to keep the collaboration on a sensible path and to serve as an excellent sounding board for ideas and plans. People found him pleasant to interact with, perhaps because he had the gift of actually listening to what was said and because he was instinctively supportive—never competitive.

Over the years, Harry served on various Fermilab committees associated with hiring and tenure, including as chair of the committee on scientific appointments in 2002 to 2003. One of his particular concerns was the support and mentoring of younger physicists. A strong and enthusiastic advocate of the postdoctoral researchers at D-Zero, Harry had a special bond with them. He frequently was one of the first faces they saw during their job interview. Harry also was a continuing source of able advice and support—and tolerance for opinions different from his—on subjects as diverse as physics, skiing, golf, and space travel.

We miss his guidance and friendship.

Maris Abolins
Michigan State University
East Lansing
Heidi Schellman
Northwestern University
Evanston, Illinois
Petros Rapidis
Linda Stutte
John Womersley
Fermi National Accelerator Laboratory
Batavia, Illinois

Arthur Roberts

Arthur Roberts, retired particle physicist and a musician and composer, died in Honolulu, Hawaii, on 22 April 2004. His career included 60 years of particle physics and contributions to medicine, national defense, and music.

Born on 6 July 1912 in New York City, Art received his BS in physics at the City College of New York in 1931 and his MA in physics from Columbia University in 1933. Three years later, he received his PhD in physics from New York University. He also earned an MA in piano performance in 1933 from the Manhattan School of Music, where he met a voice major who would later become his wife of more than 60 years.

During the late 1930s, Art held joint appointments with the MIT cyclotron group and Harvard Medical School and also taught at the New England Conservatory of Music. His physics work included the first tracer use of radioiodine for the diagnosis and treatment of thyroid problems, for which he received the Award of Honor in 1976 from the New England chapter of the Society for Nuclear Medicine.

Art joined the MIT Radiation Laboratory in 1941 to head a group that developed microwave "beacons." Such a beacon receives a microwave pulse from an airborne radar and responds with a coded set of pulses that identify the beacon, making it a "radar lighthouse." Alternatively, the beacon may be placed on an aircraft to identify a specific aircraft to other radars. During World War II, the British civilian radar organization, Telecommunications Research Establishment, had developed a radar system codenamed Oboe: A pathfinder aircraft carrying a beacon flew at a constant distance from one ground radar and, when the aircraft was at the correct distance from a second ground radar, dropped flares or bombs. Art's group converted the Oboe system to microwave frequencies after the Germans learned to jam the lower-frequency British system. Both British and US pathfinders used this microwave system to perform a useful portion of their strategic bombing from 1944 to 1945. Art received a Presidential Certificate of Merit (1948) from President Harry S Truman for that work. Other beacon systems developed by Art's group saw combat use in directing paratroops and fighter aircraft.

Following the war, Art joined the University of Iowa, where he and his collaborators measured the magnetic moment of the neutron and deuteron. In 1950, he moved to the University of Rochester, where he and his team used pions from Rochester's synchrocyclotron to explore the pion–nucleon interaction. Art helped found the Rochester Conference series (now called the International Conference on High Energy Physics). His daughter, Judy Neale, recalls that, on one occasion at her childhood home, Enrico Fermi was hiding out with the children to watch television while other guests were gathered around the piano; as Fermi had said, a Chicago professor could not be seen to be watching TV. She also recounts her surprise when her father told her that he did not know why two electrons could not be in the same orbit but that a nice man by the name of Wolfgang Pauli explained it clearly.

In 1960, Art joined Argonne National Laboratory, where he invented the now ubiquitous ring imaging Cherenkov counter and made innovations in spark chamber design. In 1967, he joined the fledgling National Accelerator Laboratory (now Fermilab) and, in 1968 and 1969, ran summer studies that sketched out the initial research program. He served as chairman of the physics department from 1972 to 1973. His own research was in particle physics, mainly hyperons.

Art then became fascinated with the possibility of using a giant underwater detector to begin studying neutrino astronomy. In 1976, he helped organize a workshop in Hawaii that led to the Deep Underwater Muon and Neutrino Detection, Baikal, IMB, and Kamioka programs; to detector studies; and subsequently toward neutrino astronomy. Four years later, Art and one of us (Learned) moved to the University of Hawaii to work under Fred Reines. Art did calculations, invented optical systems, went to sea to study ocean properties, and participated in the first DUMAND measurements of muons in the deep ocean. His last academic contribution was a history of the DUMAND project.

Art was a serious composer whose *Overture for the Dedication of a Nuclear Reactor* was performed by the Oak Ridge Symphony Orchestra in 1955 and broadcast nationally. The photo at left shows Art seated at the piano, surrounded by some of the orchestra members. This photo was published in Earl Dumour's article "An Interview with Arthur Roberts" in the Summer 1993 issue of the *Computer Music Journal* (pages 17–22). Art also wrote a serious science fiction opera and translated Offenbach operettas. But he was perhaps best known throughout the physics community for his lighthearted and clever songs about physics. For example, to

Arthur Roberts (far right)

commemorate the awarding of the Nobel Prize to I. I. Rabi, associate director of the MIT Radiation Laboratory, the lab held a party, the highlight of which was Art's "Rabi Song." Art also composed other songs, many for his wife, Janice, to sing, including "Female Physicist" and "Lament of the Faculty Wife." He wrote about his songs in a November 1948 article published in PHYSICS TODAY (page 17) and many of his lyrics and recordings are available online at http://www.haverford.edu/physics-astro/songs/roberts/roberts.htm.

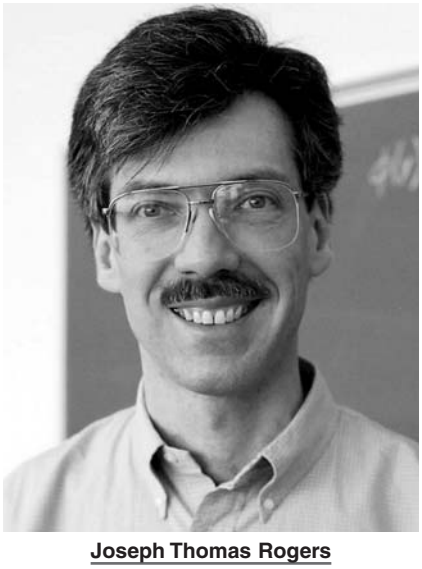
Art's last few years were clouded by Alzheimer's disease, but he retained his ability to play the piano until near the end. He died peacefully, surrounded by his family. So passed the "bard of physics." We miss him.

John G. Learned
University of Hawaii at Manoa
Honolulu
Joseph B. Platt
Harvey Mudd College
Claremont, California

Joseph Thomas Rogers

Joseph Thomas Rogers died of neuroendocrine cancer on 25 May 2004 in Ithaca, New York. He was an associate professor of physics at Cornell University who made a major effort on the design of the international linear collider.

Joe was born in Chicago on 22 October 1957 and lived most of his childhood nearby in Glen Ellyn, Illinois. He received a BS in physics from SUNY Stony Brook (now Stony Brook University) in 1980 and won the university's Outstanding Student Award. After graduating, Joe joined Quantronix Corp, a laser manufacturer in East Setauket, New York, as a research engineer.



Joseph Thomas Rogers

He was admitted to the University of Rochester's graduate program in physics in the fall of 1982 and began research on the use of superconducting microwave cavities to look for energy-dependent, long-range forces associated with Fermilab's proton beam. His PhD thesis, prepared under the guidance of Adrian Melissinos, was entitled "Limits on the Electromagnetic Coupling and Density of Galactic Axions." In that work, Joe showed great versatility in technology and physics as well as very broad scientific interests. Topics in astrophysics and cosmology, though, remained close to his heart throughout his career.

After earning his doctorate in 1987, Joe traveled to Rome, where he spent a year as a visiting scientist at the Istituto di Fisica dello Spazio Interplanetario. He returned to Rochester as a research associate stationed at Brookhaven National Laboratory, where he started working on an experiment that used high-field superconducting magnets and optical techniques to measure the birefringence of the vacuum. From 1987 to 1989, Joe wrote papers and internal notes on such wide-ranging topics as investigation of antihydrogen using a Penning trap and an idea to measure Hawking radiation emitted by an electron trapped in a circular orbit.

Brookhaven recognized Joe's talents early on and offered him a staff position at the National Synchrotron Light Source; that job sparked his interest in accelerators. He worked on advanced electron-beam diagnostic instrumentation relevant to both the storage rings and the Accelerator Test Facility.

In 1992, Joe took up an assistant professorship in accelerator physics at Cornell and immediately got involved in problems involving the Cornell Electron Storage Ring. He discovered the cause of an instability that had plagued the ring for many years: Electrons trapped in the combined magnetic field and electric field were leaking out of the pumping slots of the distributed pumps. The problem was solved by lowering the pump operating voltage. Another major contribution he made was the production of a multi-bunch feedback system, parts of which are still in use. Joe was one of the very first to write a practical "strong–strong" beam–beam interaction program, which was used to good effect in the effort to increase luminosity.

From 2000 until his death, Joe was deeply involved in the international efforts to evaluate the state of R&D on the linear collider, a key element in the technology choice accepted and announced by the International Committee for Future Accelerators in August 2004. At the time of his death, Joe had been hard at work on an innovative scheme to sharply reduce the cost of the damping rings for the linear collider. Characteristically, he also had been working on the role that coherent synchrotron radiation might be playing in pulsars.

Joe had striking personal characteristics. His colleagues at Brookhaven described him as an easy person to like—cheerful, friendly, warm, and gentle. They recall that he had a gift for finding simple solutions to complex problems and could communicate his results in an elegant manner. He enjoyed his work, and that, combined with his quick intellect, led to thorough and superbly performing systems that remain in use today. One student in Joe's class commented that he was a genuinely nice man who was neither arrogant nor presuming. On an evaluation, the student wrote, "This class was the best physics class I've had at Cornell."

With Joe's passing, we have lost a brilliant scientist and teacher and one of the nicest people we have ever met.

Maury Tigner
Cornell University
Ithaca, New York ■