Athletic activity formed a major counterpoint to Phil's science. His varsity basketball at MIT continued into pick-up games at Bell Labs, gradually to be replaced by tennis, which he played the rest of his active life. He loved the outdoors, from winter ski trips to mountain hikes to weeklong backpacking trips in western wilderness areas. An avid sports fan, Phil followed his favorite teams in baseball, basketball, and football. Two days before his death, as he sat enthralled by the final tense moments of the 2012 Super Bowl, he made an unprecedented statement: "This has been such a good game that I don't even care if the Giants lose!" Metaphorically, that summarized his life in physics—he loved the game. And he scored his own share of winning touchdowns.

D. R. Hamann
Rutgers University
Piscataway, New Jersey
Eric D. Isaacs
Argonne National Laboratory
Argonne, Illinois


AIP/ESVA, GALLERY OF MEMBER SOCIETY PRESIDENTS

David Sayre

David Sayre

David Sayre, a ground-breaking crystallographer, leader in coherent diffraction imaging, member of the team that wrote the original Fortran compiler, and visionary leader in x-ray microscopy, died of complications from Parkinson's disease on 23 February 2012 in Bridgewater, New Jersey.

Born on 2 March 1924 in New York City, David received his BS in physics from Yale University at the age of 19. During 1943–46 he worked on radar at the MIT Radiation Laboratory before going to graduate school. He received his PhD from Oxford University in 1951 in x-ray crystallography, working with Dorothy Hodgkin. During that time David and his wife, Anne, got to know Rosalind Franklin, another young crystallographer who was working at King's College London.

David wrote some of his seminal papers during 1951–52. He had discovered what is known today as Sayre's equation, which was the critical step needed in the development of direct methods in crystallography. His half-page 1952 paper in *Acta Crystallographica*, "Some implications of a theorem due to Shannon," forms the foundation of diffraction microscopy, also known as coherent diffraction imaging and lensless imaging. Sixty years later it is still frequently cited in the literature.

Between 1956 and 1990, David worked for IBM. He was part of the team that developed Fortran as the first high-level language for technical computing. He was the first assistant manager of the Fortran development group and later corporate director of programming. In 1969, while he was leader of programming research, he and his team showed that the virtual memory overlay system worked consistently better than the best manually controlled ones; that put to rest the debate over which memory system worked best for commercial computers. In 1971 he proposed that IBM's newly developed electron-beam microfabrication technique be used to make Fresnel zone plates for x-ray microscopy. That idea took a decade to be realized, but it is now the basis of the rapidly growing field of x-ray microscopy at synchrotron light sources worldwide and of commercial laboratory instruments made by the company Xradia, founded by one of David's first PhD students, Wenbing Yun.

In 1972–73 the Sayres returned to Oxford for a sabbatical visit, where David immersed himself again in the world of x-ray crystallography in Hodgkin's lab. It was after James Watson had written *The Double Helix* (Atheneum, 1968), in which he treated Franklin's contributions to DNA structure determination in a scandalously dismissive way. That book inspired Anne Sayre to write her own, *Rosalind Franklin and DNA* (Norton, 1975), which became a bestseller and went a long way toward setting the record straight. During the sabbatical, David met one of us (Kirz, visiting from Stony Brook University and, as it turned out, living only about 10 miles from David back in the US); together they became interested in x-ray microscopy of noncrystalline specimens.

Subsequently, David deepened his involvement in x-ray microscopy. He realized that due to the short wavelengths involved, x rays could reach higher resolution than standard visible-light microscopes, and due to the penetrating nature of the radiation, x-ray microscopes would not be limited to use with ultrathin samples, as are electron microscopes. He worked on contact microscopy at IBM, and later, using the National Synchrotron Light Source at Brookhaven National Laboratory, he helped develop scanning and diffraction-based microscopes.

David's last great scientific contribution was diffraction microscopy. In 1980 he realized that synchrotron light sources may be powerful enough to provide sufficient coherent x rays so that the diffraction patterns of noncrystalline specimens could be recorded. Those patterns would be continuous and not restricted to Bragg peaks. David conjectured that even though only the intensity could be recorded and not the phase, the information could be sampled on a finer grid than Bragg peaks from crystals, and that may make the phase reconstruction possible.

In the 1980s David recorded the first diffraction patterns from noncrystalline samples. After his retirement from IBM, David served as an adjunct professor at Stony Brook University. In the 1990s, working with Henry Chapman (then a Stony Brook postdoc) and another of us (Miao, then a graduate student), he was able to apply James Fienup's iterative algorithm to find the phases for a computer-generated diffraction pattern. The final breakthrough came when Miao reconstructed an experimentally recorded diffraction pattern. That achievement opened up the field of diffraction microscopy, which is now practiced in various forms at many x-ray facilities around the world and is the basis for single-particle imaging, a prominent experimental program at SLAC's recently commissioned free-electron laser, at Japan's SPring-8 synchrotron radiation facility, and at the Fermi FEL in Trieste, Italy.

During his career, David served on the US National Committee for Crystallography, among others. In 1983 he was president of the American Crystallographic Association, and he received its Fankuchen Award in 1989. In 2008, at the International Union of Crystallography's triennial Congress in Osaka, Japan, he was presented with the organization's highest award, the Ewald Prize.

David was a superb scientist, a warm-hearted colleague, and an exceptional mentor. He is greatly missed.

Janos Kirz
Lawrence Berkeley National Laboratory
Berkeley, California
Chris Jacobsen
Argonne National Laboratory
Argonne, Illinois
Jianwei Miao
University of California, Los Angeles

Norbert Untersteiner

Norbert Untersteiner, a pioneer in polar geophysics, passed away from prostate cancer on 14 March 2012 in Seattle, Washington. Much of the present interest in the role of the Arctic in global climate can be traced to Norbert, who founded the modern thermodynamic theory of sea ice.

Born on 24 February 1926 in Merano, Italy, Norbert was in Salzburg, Austria, in 1938 when Germany annexed the country. He studied physics at the University of Innsbruck and completed his PhD thesis on seiche waves with Albert Defant in 1950. Norbert then became an *assistent* to meteorologist and geophysicist Heinrich von Ficker in Vienna and honed his expertise in glacier mass and radiation balance. Thus it was not surprising that in 1954 he was approached by Reinhard Sander to be a scientific member of an expedition to Asia's Karakoram Range.

As part of the International Geophysical Year (IGY), in January 1957 Norbert was appointed by the University of Washington (UW) in Seattle as scientific leader of Ice Station Alpha, one of two floating stations in the Arctic Ocean during that time. By June, Station Alpha was fully operational, and in 1958 Norbert became one of the few Western scientists to summer over on the ice; he stayed to November. He then returned to his post in Vienna and was awarded the Austrian Honorary Cross for Science and Arts, and in 1960 he was appointed *Dozent*, or instructor, at the University of Vienna. His research through 1961 appeared mainly in German, but his seminal IGY paper "On the mass and heat budget of Arctic sea ice" appeared in English. In 1962 Norbert returned to the UW, and by 1967 he was professor of atmospheric science—he chaired the department from 1988 to 1997—and of geophysics. He then went to the University of Alaska Fairbanks, where he held the Sydney Chapman Endowed Chair in Physical Sciences from 1998 to 2005.