

Benjamin Shen, Physics and Astronomy

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Benjamin Shih-Ping Shen, the Reese W. Flower Professor Emeritus in the department of physics and astronomy in the School of Arts and Sciences and Penn's Interim Provost from 1980 to 1981, passed away at home on April 10. He was 90.

Dr. Shen was born in 1931 in Hangzhou, China. He graduated from a French lycée in Shanghai and studied engineering briefly at the National Taiwan University. In 1954, he graduated with a degree in mathematics from Assumption College (now University) in Worcester, Massachusetts, where most of his courses were taught in French. After receiving a master's degree in physics from Clark University, he earned a National DSc in physics from the University of Paris in 1964 under Pierre Auger, discoverer of the Auger electron. Dr. Shen joined the Penn faculty in 1966 as an associate professor of astronomy, becoming a full professor in 1968 and the Reese W. Flower Professor of Astronomy and Astrophysics in 1972. He served as chair of the department of astronomy and astrophysics from 1973 to 1979. During his time as department chair, the name of the department was changed from astronomy to astronomy and astrophysics, reflecting a broadening of research interests in the department. Beginning in 1968, Dr. Shen served as director of Penn's Flower and Cook Observatory. During the 1970s and 1980s, he served on several Faculty Senate and University Council committees.

In 1979, Dr. Shen was named Associate Provost by then-Provost Vartan Gregorian. The next year, he was named Acting (Interim) Provost after Dr. Gregorian's resignation (*Almanac* October 14, 1980 (<https://almanac.upenn.edu/archive/v27pdf/n08/101480.pdf>)). During his tenure as Acting Provost, Dr. Shen oversaw a restructuring of Penn's graduate education and convened the Task Force on the Quality of Teaching, which led to the creation of new teaching awards across Penn's schools. In 1981, Dr. Shen resigned as Acting Provost, but continued to head the task force that he had launched. During the 1980s, he continued his membership in Penn's governance bodies, and in 1993 he served on then-President Sheldon Hackney's Commission on Strengthening the University Community. Dr. Shen retired from Penn in 1996. In retirement, he served as the second president of the Penn Association of Senior and Emeritus Faculty (PASEF).

A pioneer in the use of particle accelerators for astrophysical research, Dr. Shen's scientific work centered around the cascade of nuclear interactions triggered by cosmic rays, high energy particles that move through space at nearly the speed of light. He was the first to show, in 1961, that the breakup, or "spallation," of interstellar nuclei by cosmic rays could be the long-sought origin of certain rare chemical elements in the universe. His accelerator experiments greatly influenced the science of shielding against cosmic radiation in the early days of the space age; in 1963, the journal *Astronautica Acta* devoted an entire issue to his work. He also contributed to the early research on the exploding cores of galaxies and quasars. He edited and contributed writing to two books on nuclear astrophysics: *High-Energy Nuclear Reactions in Astrophysics* (1967) and *Spallation Nuclear Reactions and Their Applications* (1976), and was the author of many peer-reviewed articles.

In addition to his work at Penn, Dr. Shen engaged actively with the broader scientific community. In 1972, he was appointed the head of a New York Academy of Sciences committee to improve scientific communication to the general public, and in the same year, he was named a fellow of the American Physical Society. As part of this effort, in a 1975 essay, he introduced the concept of "civic science literacy," the basic scientific knowledge needed by the general public and policymakers in an increasingly technological society.

In 1990, he was appointed to the National Science Board, where he was a strong advocate for basic science funding and where he chaired a task force on scientific literacy. He was an advisor to the Children's Television Workshop (now Sesame Workshop) on its science programs, including the award-winning series *3-2-1 Contact*. He became an advisor on science and technology to the Senate Budget Committee (1976-1977) and to the Congressional Office of Technological Assessment (1977-1978). In 1978, he was awarded the Vermeil Medal of the Société d'Encouragement au Progrès. In the late 1970s, he chaired a nationwide panel of the American Association for the Advancement of Science, and in 1996, he was named a fellow of the AAAS. In 1993, he was named a Chevalier of the Ordre des Palmes Académiques in France.

In his leisure time, Dr. Shen practiced Chinese calligraphy and built bicycles for himself and his children with vintage parts he found online.

Dr. Shen is survived by his wife, Lucia Shen; his son, William Shen; his daughter, Juliet Shen (Shane Watters); and a granddaughter. A funeral mass was held on April 21 at St. Agatha-St. James Catholic Church in Philadelphia, followed by burial at Woodlands Cemetery. Donations in his memory may be made to Philly PAWS (<https://phillypaws.org/>).