In Remembrance

Nuclear physicist Peter T. Demos dies at 94.

Longtime faculty member guided MIT's Bates Linear Accelerator from a groundbreaking idea to a globally renowned center for the study of nuclear structure and reactions.

by Sarah H. Wright

Peter T. Demos, a nuclear physicist who guided MIT's Bates Linear Accelerator from a groundbreaking idea in 1961 to a globally renowned center for the study of nuclear structure and reactions, died of coronary artery disease on September 18, 2012. A longtime resident of Belmont, Mass., Demos was 94.

Demos was a "remarkable scientific leader," said Robert Redwine, a professor of physics at MIT and current director of the Bates Center. "His excellent scientific taste, his unquestioned integrity, and his determination to support every user of the laboratory were critical in establishing a style of operation that was a model for laboratories around the world."

The Bates Accelerator "opened up a huge new area of research in nuclear physics. We pioneered studies in high-resolution electron scattering and started a program in coincidence experiments," said MIT physics professor Stanley Kowalski, Demos' former student and faculty colleague. Demos and Kowalski worked with a team of MIT physicists to launch the Bates facility.

Demos served as director of the Bates Center from 1973 to 1983. During its more-than-30-year life as an international center for the study of nuclear physics, scientists came from around the world to use the facility in Middleton, Mass.

Photo courtesy of the MIT Laboratory for Nuclear Science

Before developing and directing Bates, Demos served as a leader in the design and construction of MIT's first microwave linear accelerator, completed in 1951. During the 1960s, he was a trustee to the group of nine universities, including MIT, founded to operate the Brookhaven National Laboratory's proton accelerator.

"Those whose passion is to understand the basic nature of matter and energy are in Peter Demos' debt," John M. Deutch, Institute Professor of Chemistry and dean emeritus of the School of Science, noted when Demos retired as Bates director. "He gave us essential leadership—a remarkable national resource for physics research, a tool of inestimable value."

The Bates Center now provides critical technical support for MIT researchers and their collaborators in nuclear and particle physics experiments, and houses the largest MIT facility for high-performance computing. Bates staff members also collaborate on applications of accelerator technology to projects in medical physics and in homeland security.

Demos' legacy was honored when the Peter T. Demos Award was established to recognize a graduate student who demonstrates the "spirit, persistence and intellectual qualities" Demos embodied over his long career.

Research and a leap

An expert in radiation and applications of radiation, Demos specialized in ballistics and radar studies before coming to MIT with his young family in 1946 as a research associate. He earned his PhD at the Institute in 1951 and joined the MIT physics faculty in 1957, becoming a full professor and director of the Laboratory for Nuclear Science (LNS) in 1961. He served as LNS director until 1973.

As director of LNS and Bates, Demos "pushed heaven and earth to get good ideas implemented. His efforts were very important toward having LNS recognized as a world leader in nuclear and particle physics," said William Bertozzi, a professor of physics at MIT and Demos' first graduate student.

Demos' early MIT work, concentrating on low-energy physics and photonuclear reactions, might have set him on a conventionally successful academic career. But he made a classic MIT leap: When an innovative, hands-on project arose—building one of the first linear accelerators, a 17-million-electron-volt machine—Demos twice set aside his doctoral research to get the room-sized device working.

At that time there were three accelerators on MIT's campus—a synchrotron in Building 24, a cyclotron in Building 44 and the linear accelerator, or linac, that Demos and his team built in Building 20. "The linac made possible world-leading research," Kowalski recalled. "It truly was an exciting time to do physics." Demos' example and his generosity helped harness those exciting times at MIT. His support was "crucial to success in experimental research. In his quiet but convincing style he helped open many doors of opportunity and recognition for the faculty and research staff," Bertozzi said. "I shall miss his advice and counsel."

Not surprisingly, Demos advocated breadth in physics education and flexibility with young physicists as they grew, as he did, through experience. A devoted mentor and educator, he once wrote that while he valued a "good undergraduate physics education and direct experience with good experimental work, I have learned the most from teaching others."

In recent years, Demos was interested in energy issues as well as new techniques for cooling hadron beams at high energies. "He was a wise and regular contributor to informal discussions on energy in LNS in the years 2007 to 2010. With his LNS colleagues, he co-authored an article in the MIT Faculty Newsletter on nuclear energy in 2008," noted Richard Milner, the current LNS director and a professor of physics.

Demos was a member of the American Physical Society and of the American Academy of Arts and Sciences and a former director of the advisory panel to the Center for Radiation Physics Division at the National Bureau of Standards. He also served as chair of the Committee on Radiation of the National Research Council.

A native of Toronto, Demos became a U.S. citizen in 1958. His wife of 62 years, Elizabeth (Betty) Jean, died in 2003. He is survived by his sons, Theodore of California and John of Maine; his daughter Ellen of Ireland; his sister Georgia Davies of Calgary, Alberta; six grandchildren; three great-grandchildren; and many devoted Canadian and American nieces and nephews.