

John Bardeen

Born May 23, 1908, Madison, Wis.; died January 30, 1991, Boston, Mass.; co-inventor in 1947 of the transistor with William Shockley and Walter Brattain.



Education: BS, physics: University of Wisconsin, 1928; MS 1929; PhD, Princeton University, mathematics and physics, 1936.

Professional Experience: worked as a geophysicist with the Gulf Research and Development Corp., 1930-1933; junior fellow, Harvard University, 1935-1938; assistant professor of physics, University of Minnesota, 1938-1941; physicist, US Naval Ordnance Laboratory, Washington D.C., 1941-1945; research physicist, Bell Telephone Laboratories, 1945-1951; professor, electrical engineering and physics, 1951-1978, emeritus professor of electrical engineering and physics, University of Illinois, Urbana, Ill., 1975-1991.

Honors and Awards: Nobel Prize, physics, 1956 and 1972, the only scientist ever to receive two Nobel Prizes in the same field; Fritz London Award, 1962; National Medal of Science, 1965; Michelson-Morley Award, 1968; Medal of Honor, IEEE, 1971; Lomonosov Prize from the Soviet Academy of Science, 1988; Third Century Award, 1990; member, National Academy of Science; member, American Academy of Arts and Science; fellow, American Physics Society; fellow, IEEE.

John Bardeen, the last surviving member of the three-man team that developed the transistor, and who twice won the Nobel Prize, died Wednesday January 30, 1991.¹ Catherine Foster, a spokeswoman for the University of Illinois, where Bardeen was Professor Emeritus, said he died at Brigham and Women's Hospital in Boston. "He had gone to see a doctor and had had exploratory surgery [Tuesday] and seemed to come through fine, I understand," she said. "But this morning he suffered cardiac arrest."

Bardeen, an electrical engineer and physicist, won the Nobel Prize in 1956 as the co-inventor of the transistor, and again in 1972 as co-developer of the theory of superconductivity at low temperatures. He was the last living member of the Bell Telephone Laboratories transistor research team, which included Walter Brattain, who died in 1987, and William P. Shockley, who died in 1989. Their work, completed in 1947, made the vacuum tube obsolete. Direct descendants of the transistor are the integrated circuits on devices ranging from the space shuttle to videocassette recorders and from calculators to computers.

Bardeen once told a reporter that "I knew the transistor was important, but I never foresaw the revolution in electronics it, would bring." Yet it was the development of the theory of low-temperature superconductivity (with Leon Cooper and J. Robert Schrieffer) of which he was most proud. "Superconductivity was more difficult to solve and it required some radically new concepts," Bardeen said after the announcement of his second Nobel Prize. Superconductivity, in which electricity travels with little or no resistance, helped researchers develop such medical diagnostic tools as magnetic imaging, and made high-speed computers possible.

¹From Folkart, Burt A., 'John Bardeen; Physicist Won 2 Nobels,' Los Angeles Times, January 31, 1991.

Among Bardeen's other honors were the 1965 Medal of Science, the 1976 Presidential Medal of Freedom, and the 1988 Lomonosov Prize from the Soviet Academy of Science. He also held membership in 14 professional societies and had received 16 honorary doctorates.

In 1990 *Life Magazine* named him one of the 100 most influential Americans of the 20th century, and President Bush made him one of 11 recipients of the Third Century Award for creative contributions to America.

He taught at the University of Minnesota, did research at the Naval Ordnance Laboratory in Washington D.C., and joined the Bell research group in physics at Murray Hill, NJ. He joined the University of Illinois faculty in 1951 and retired in 1975.

In 1983, Japan's Sony Corporation donated \$3 million to endow a John Bardeen research and teaching chair in electrical and computer engineering at the University of Illinois.

BIBLIOGRAPHY

Significant Publications

Bardeen, John, Walter Brattain, and William Shockley, *Nobel Lectures-Physics*, 1942-62, Elsevier, New York, 1964.

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